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The Research Quarterly

of the

American Physical Education Association

Vol. IV DECEMBER, 1933 No. 4

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Evaluation of Qualities and Capacities Essential to Teaching Success

By HELEN MCKINSTRY, M.A.
Director, School of Physical Education, Russell Sage College
Troy, New York

INTRODUCTION

DURING the past decade numerous studies have been made in the attempt to rate the personality of prospective teachers; to measure teaching efficiency; to set standards for the selection of students for teachers colleges; and to determine the relationship between ratings of student teachers in college and their success in the first year of teaching.* The results of some of the most notable of these studies have been published in educational journals by Charters and Waples,†[9] Flory,[17] Nanninga,[28] Sears,[35] Wagenhorst,[41] Almy and Sorrenson,[45] Dunkle,[51] Kelly,[23] Kelly and Anderson,[59] Mead,[62] Morrison,[63] Snavely,[66] Ullman,[69] and Whitney.[73] Our own professional journals have contained similar articles by La Porte,[24] Ashbrook,[2] Berry,[5] Brownell,[8] and Scott.[65]

Our schools of physical education have apparently been no more careless in the matter of admissions to training than have the majority of teachers colleges and normal schools, but the fact stands that we have been too thoughtless of the ultimate results to our profession, or else we have credited ourselves with little less than superhuman power in the molding and training of poor material.

We have accepted candidates on the basis of good health and physical prowess, with too little thought for the quality of leadership of which they might be capable. It may be safely stated that we are recognizing all too clearly that steps must be taken by training schools to:

1. Select more carefully from would-be aspirants for the profession;
2. Give a training that shall include far more than the technique of performing and teaching activities; and
3. Graduate only such students as will be able and trusted pioneers of a new profession.

For ten years the Central School of Hygiene and Physical Education (now the School of Physical Education and Hygiene of Russell Sage College) made an earnest attempt to discriminate carefully in the ad-

* Address presented at the Eastern District Association Convention, Teacher-Training Section, Springfield, Massachusetts, April, 1933.
† Numbers refer to Bibliography at end of article.

mission of students; to evaluate and train "the whole woman" while she was under its guidance; and to graduate only those young women who were believed to be worthy of the profession.

Very definite methods of estimating ability were employed during training, and graduates were followed up during their first years of teaching.

In June 1932, the director of the former Central School submitted "A Study of the Estimated Success of Graduates of a Normal School of Physical Education" in partial fulfillment of the requirements for the degree of Master of Arts in the School of Education of New York University. This paper will be confined to the findings of that thesis, or to an evaluation of the attempt of the Central School to determine whether potential leadership in physical education may be estimated during the period of training.

To summarize the study as it was pursued, the endeavor was made to:

1. Analyze and enumerate the abilities, knowledges, and characteristics deemed necessary to success in the teaching of physical education. Conclusions were drawn from the investigator's study of the problem and from the findings of other investigators.

2. Enumerate the abilities, knowledges, and characteristics considered, and describe the methods used by the Central School in evaluating the success (while in training) of ninety graduates of the school, all of whom are teaching at the present time.

3. Describe the method used in securing estimates of the success of these ninety young women in their actual teaching situations.

4. Present the comparative results of these two methods of evaluation and draw conclusions from them.

5. Compare the results of such study with similar work of other investigators.

6. Draw, from a résumé of these studies, whatever might be found to have definite educational implications of value for further practical use and investigation.

FUNDAMENTAL PROBLEMS AS A BACKGROUND

A. ESSENTIALS TO TEACHING POWER IN PHYSICAL EDUCATION

As a basis for the study it was assumed that the major essentials to teaching success might be listed under five main headings:

1. Physical fitness
2. Knowledge of principles and technique of physical education, and of foundation sciences
3. Skill in performance of physical activities
4. Skill in teaching technique
5. Character and personality

B. MAIN CONCLUSIONS OF PREVIOUS INVESTIGATORS

This method of classification is substantiated by Scott,[65] Rowe,[54] Hines,[22] Sundwall,[67] Dunkle,[51] and Brownell,[8] and also by the findings of the Sub-committee on Personnel of the Leadership Training Committee, of the Recreation and Physical Education Committee, of the White House Conference on Child Health and Protection.[72]

C. RESUME

A survey of physical education literature yields no statistical study of the evaluation of leadership in physical education that is comparable to the one about to be described. From a study of numerous articles, however, there seems to be little difference of opinion relative to the dependence of successful teaching upon health, and good posture; adequate preparation for the profession, and the intelligence to profit by training; motor ability sufficient to demonstrate the usual activities in physical education with more than average skill; real teaching ability, dependent upon knowledge of techniques, and a keen and intelligent grasp of teaching situations; and, above all, qualities of character and personality as the foundations of all positive, constructive leadership.

DESCRIPTION OF METHODS EMPLOYED IN THIS STUDY

A. PRELIMINARY STATEMENT

1. History of the Study

This study was not based upon a plan of research carefully outlined with the thesis in mind. The data from which deductions were drawn was taken from records made by the Central School between 1919 and 1929.

From the inception of the school no candidate was considered who could not present:

a. An acceptable record of academic work, and graduation from a recognized secondary school;

b. A good health record as shown by a certificate from her personal physician, and from the findings of a thorough medical examination made by the school physician;

c. Statements from reputable persons, relative to the candidate's character and potential leadership; and

d. A type of physique and personality that gave promise of superior ability.

From the admission of its first class, a student was evaluated by the school from the five points of view previously mentioned and definite methods of grading her, from each of these aspects of her fitness for teaching, were evolved and put into practice.

These methods were changed during the years but the principles underlying the grading remained the same:

a. Character and personality are of first importance.

b. Physical fitness and good posture are imperative.

c. A passing grade of 70 per cent must be secured in all theoretical subjects.

d. Average skill in performance, meriting a 70 per cent grade in all practical activities, is essential.

e. Teaching success must be evidenced in actual teaching situations.

The school always operated on the assumption that the acquisition of points alone did not make a teacher. The acceptance of such a principle immediately placed upon the school faculty the obligation to do far more for students than merely to teach subjects and skills. As a consequence, an adviser system was established. Each faculty adviser had personal conferences with an assigned group of students at least four times a year. During such conferences, the adviser reviewed with each student her standing in the school, in terms of percentage grades and rank, in her theoretical subjects, practical skills, practice teaching, physical condition, and personality and character. The aim of the school was to know every student as a woman, a potential leader, a student, an athlete, and a technical teacher; to help her, through searching analysis of her ability, and constructive criticism and suggestion, to correct defects, strengthen weak points, and lift herself and her work toward the ideal standards set by the school for its graduates.

The data thus accumulated for practical use with students in training is used in this study as furnishing the school estimate of the potential success of its graduates.

An estimate of actual teaching success is based upon the percentage grades and ranks obtained from questionnaires sent to employers of graduates of the Central School. These questionnaires were used as part of the follow-up system of graduates.

Employers were asked to evaluate their teachers by rating the attributes, qualities, and abilities listed, as compared with other teachers of physical education with whose work they were familiar. Employers were directed to indicate by an (x) after each attribute, quality, and ability whether the young teachers rated in the fourth (highest), third, second, or first (lowest) quarter of the teachers they had known.

2. Type of Subjects Studied and Method of Selection

For the purpose of the study, ninety graduates of the school were selected. The choice of the ninety subjects was made on the basis of two items in the questionnaire—"teaching power" and "leadership." Without reference to the names or school estimate of graduates, three groups (of thirty women in each group) were selected at random from the questionnaires on file.

Group I was composed of thirty graduates ranked by their employers as falling in the highest quarter in both teaching power and leadership.

Group II included thirty women ranked in the next highest quarter. Group III was composed of thirty graduates ranked by employers as falling in the lower half, or the the first and second quarters in teaching power and leadership.

a. Salaries of the Three Groups.—The average salaries of members of the three groups were: Group I, $1940.00; Group II, $1760.00; Group III, $1565.00.

b. Age at Graduation.—At the time of graduation, the median ages of the three groups were: Group I, 22 years; Groups II and III, 21 years. The upper quartile ages were: Group I, 25 years; Groups II and III, 22 years.

B. ENUMERATION AND CLASSIFICATION, AND METHODS OF EVALUATING THE ABILITIES CONSIDERED

1. Physical Fitness or Condition

For the purposes of this study, physical condition was evaluated in terms of the anthropometric and orthopaedic examination. This examination was made three times each year, and scored by a table compiled by the school.

A thorough physical examination was made by the school physician three times annually, and was also given a percentage grade. Inasmuch as all students had to rate a high 80 per cent in the physician's examination in order to enter the school, and have a grade of 90 per cent in this examination in order to graduate, the physician's examination was not considered in this study. In other words, health and organic soundness and capacity were assumed as prerequisites both for admission to, and graduation from, the school.

The school has always considered that the anthropometric-orthopaedic examination gives a valuable estimate of physique and physical characteristics. It was frequently demonstrated that a student who entered the school with a grade of less than 70 per cent in this examination rarely graduated. If, at eighteen years of age, a student was so undeveloped as to be unable to rate a high 70 per cent–80 per cent in this examination, her chances of raising the grade to 90 per cent were exceedingly poor.

The tests and measurements scored to secure the grade on physical condition were: physique type; the ratio of sitting to standing height; vital capacity; size of the sub-costal angle; type of breathing; total strength, including strength of grips, chest, shoulder retractors, back, and legs; weight with relation to height and age; strongest grip; and posture.

No test or measurement was considered to have any value in or by itself. It was the relation of each test and measurement to every other, and the composite picture of physical condition that was made by them all, that was of real value. All tests and measurements were made,

throughout the ten-year period, by the investigator and one member of her staff. An exact method of making each test was followed by both examiners, and one (only) set of apparatus was used. The grading of posture was done by one of two (only) members of the staff, and the same method was used by them both.

2. Knowledge of Subject Matter

For the purpose of securing one percentage grade that might be considered to represent a student's knowledge of the theoretical courses studied during her training, an average was found of the final grades given her in all subjects studied during her course.

3. Skill in Performance of Physical Education Activities

Sixteen types of skills were taught to, and practiced by, each student while in training. The final grades given her in each skill (gymnastics, self-testing, swimming, tennis, basketball, etc.) were averaged to give one percentage grade that might be considered to represent her skill in performance in physical activities.

4. Teaching Skill and Power

One hundred and twenty hours of practice teaching in actual teaching situations were required of a student. She was graded, during training, on her success in teaching four types of work: corrective gymnastics, swimming, sports, and some form of class work (gymnastics, dancing, self-testing activities, or group games). Each student was supervised in her teaching situations at least once each month, and her grade was based upon a detailed and formulated analysis of her teaching success. For this study, the final grades given a student in her practice-teaching of these various types of work were averaged to give one percentage grade for teaching skill and power.

5. Character and Personality

Character and personality were evaluated by a composite grade made by averaging grades for:

a. Attendance-health
b. Attendance-professional interest
c. Punctuality
d. Daily "training records"
e. Professional appearance
f. Professional attributes
g. Professional power

The school had no "cut system" for attendance. It was assumed that a student was taking the course of training with a keen desire to get everything possible from it. Student committees on attendance took entire charge of the follow-up of absences and reported each day's

absentees, together with reasons for absence, to the school office. If a student was absent from any class for health reasons, her grade "attendance-health" was affected by the loss of several points. If a student was absent for any reason other than that of ill health, points were deducted from her semester's grade on "attendance-professional interest." Absence from school for either ill health or lack of interest was exceedingly rare. Excuses, without loss of points, were rarely given save for enforced absence because of severe illness at home.

Failure to be in her seat before the beginning of a class period cost a student points on punctuality. Records for punctuality were kept by student representatives in each class.

Every student kept a daily "training record." These records were turned in to the office every two weeks. Monthly totals were kept on a permanent record card.

The method of securing grades for professional appearance, professional attributes, and professional power was as follows:

A blank was prepared by a committee of students and faculty. In a column at the left were the names of students in any given class. Along the top of the sheet were grouped attributes, qualities, or characteristics under the three headings of "professional appearance," "professional attributes," and "professional power." For example: under "appearance" were listed "care of clothes," "appropriate clothing," "good taste," "care of hair," "care of nails," "posture," etc. Under "attributes" appeared "poise and control," "honesty," "friendliness," "unselfishness," "loyalty," etc. "Professional power" was indicated by such characteristics as "initiative," "responsibility," "courage," "enthusiasm," and "force."

The page was ruled vertically and horizontally, making small squares under each attribute and opposite each student's name. Three times each year—in November, January, and May—each student was given such a blank containing the names of members of her own class. She was asked to grade each member of her class, herself included, and return the sheet, unsigned, to the office where the totals were computed.

A student's method of grading was as follows:

She started with the first name on the list and considered the various items listed under "appearance." If the classmate being considered was "careless in the care of her clothes" a check ($\surd$) was placed in the square under this item. If this was the only criticism to be made on "professional appearance," a probable grade of 85 per cent or 95 per cent was given. If two or three items were checked, a grade of not more than 65 per cent or 75 per cent was usually given. Such a grade was really a judgment grade given by each student to each of her classmates. The grade had to be one of those indicated at the top left corner of the sheet—95 per cent, 85 per cent, 75 per cent, or 65 per cent. The

grades for "professional attributes" and "professional power" were allocated in the same manner. A total grading sheet was prepared, in the office of the school, from the individual grading blanks turned in by all members of a class. All grades for a student's "professional appearance" were averaged, and her total grade (arithmetical mean) was determined. The same method was used to determine her grades for "professional attributes" and "professional power." In addition to this, on the class summary sheet, the number of checks a student had received on any item was indicated.

When the total grade and check sheet was prepared, this was used by each faculty adviser during her conferences with her particular students. The total sheet was never shown to a student, but the adviser commented on the items checked. If, by a group of thirty-five students, a girl was given twenty-one checks on "lack of friendliness," and thirteen checks on "selfishness," these denoted very general criticism by her classmates. If three or four checks were given for "culture" or "sense of humor" these were probably not mentioned, as the effort was made to concentrate on a student's most outstanding faults and lacks. A student usually asked for explicit criticism. If the adviser could give special instances of unfriendly or selfish behavior she stated them fully and frankly. If she knew of none such, she merely commented on the large number who had checked such attributes or characteristics and advised the student to give thoughtful consideration to her actions and see if she could not determine what she was doing or leaving undone that was creating such unfavorable public opinion.

The arithmetical mean of the grades given for attendance, punctuality, training record, professional appearance, attributes, and power constituted the grade given a student for character and personality.

In this study, the class rank at graduation of each of the ninety students was found. From these ranks, comparative tables were prepared showing the number (in each group of thirty students) that fell in the fourth (highest), third, second, and first (lowest) quarters in their respective classes in character and personality.

C. METHOD OF ARRANGING MATERIAL FOR COMPARATIVE PURPOSES

1. Comparison of the Three Groups

For the purpose of comparing the three groups, the median, first, and third quartiles were found for each group, in the various abilities and characteristics in which they were graded while they were in school.

2. Arrangement of Material from Employers' Questionnaires

Among the abilities checked by employers were:

a. Theoretical knowledge

b. Practical skill
c. Health and vigor
d. Leadership

Tables for each group (in each of these abilities) were prepared to show the number of teachers in each group that fell in each of the four quarters. These tables are as nearly comparable as possible with tables showing class ranks of the teachers when they were students in the school.

The remaining checks on each questionnaire were considered as character and personality estimates. The following list of attributes and characteristics were included in the estimate of character and personality: honesty, loyalty, sense of responsibility, cooperation, poise and control, sympathy and understanding, courage, common sense, initiative, self-confidence, ambition, unselfishness, emotional stability, professional standards, vision, industry, exemplary hygienic habits, personal appearance, and culture and refinement.

3. Method of Grading Employers' Evaluation of Character and Personality.

In the attempt to arrive at comparative grades for each attribute (for each group), the following method was used: For example, if for any teacher "honesty" was checked in the fourth (highest) quarter, it was given a grade of 100; if in the third quarter, a grade of 75; if in the second quarter, a grade of 50; and if in the first (lowest) quarter, a grade of 25. The arithmetical mean in percentage grades, for each attribute for each group, was then computed. The percentage grades were then arranged in a table in order to show in which of the attributes and characteristics each group ranked from high to low in terms of percentage grades given each attribute.

PRESENTATION AND INTERPRETATION OF RESULTS, AND COMPARISON OF RESULTS WITH THOSE OF OTHER INVESTIGATORS

1. Maturity

The members of Group I were, on the average, from one to three years older than the girls of Groups II and III. This added age may have given these students a more mature attack on their school work, and, as graduates, they approached teaching with a greater seriousness of purpose.

2. Physical Condition

a. Height-standing.—The young women in Group I were the tallest; and those of Group III were the shortest in standing height.

Medians: Group I, 65.4 inches; Group II, 64.6 inches; Group III, 64.6 inches.

Q. 3: Group I, 66.7 inches; Group II, 66.1 inches; Group III, 65.9 inches.

Number of women in each group who were 5 feet, 5 inches in height: Group I, 18; Group II, 13; Group III, 13.

All three groups exceed, in height-standing, the mythical freshman (1931) of Barnard College, who was 64.3 inches in height;[71] the arithmetic mean of height found by Herriott[56] of McGill University women, who were 63.51 inches in height; and Gould's[53] mean stature of Newcomb College seniors, which was 63.66 inches. The popular opinion that well-built women of average or superior height are more acceptable teachers of physical education may have given some slight theoretical advantage to Group I.

b. Height-sitting, and Ratio of Sitting-height to Standing-height.—Group I was distinctly superior in sitting-height, and in ratio of sitting to standing-height, to Groups II and III. Group I also made the greatest gain during training. Number of women in each group who had trunks that were more than two inches longer than one-half the standing-height: Group I, 15; Group II, 12; Group III, 10.

The importance of sitting-height, when compared with standing-height, as a measure of vitality, resistance to disease, and endurance, is corroborated by Hastings,[21] Tyler,[40] Fuld,[19] Dreyer,[16] and Doll.[12] It was a matter for frequent comment at the Central School, and also during the investigator's experience at Pratt Institute, that the short-trunked women were the most susceptible to acute infections, especially colds.

c. Vital Capacity.—The difference in vital capacity of the three groups was especially significant. The median vital capacities of the three groups at entrance to the school were:

Group I, 210 cu. in.; Group II, 194 cu. in.; Group III, 195 cu. in. At graduation, the medians were 223 cu. in., 215 cu. in., and 211 cu. in., respectively.

Number of women in each group who, at graduation, had vital capacities of 220 cu. in. or greater: Group I, 18; Group II, 11; Group III, 7.

No single measurement is apparently more significant in its relation to health and physical fitness than is vital capacity. Courtis,[10] DeBusk,[11] Doll,[12] and others have found a high positive correlation between vital capacity and intelligence. Whipple,[42] White and McGuire,[43] Hastings,[21] and Turner[39] consider vital capacity an important index of general physical condition and capacity. Turner's[68] study of sixty-one senior officers at Mt. Holyoke College, covering a five-year period, found forty-three to be A in vital capacity; thirteen, B; and three, C. She comments on the fact that these officers were chosen by the student body because of their success in human relations.

A similar study recently made of Russell Sage College students holding important college offices during the current year, shows the

median vital capacity of the officers to be 222 cu. in., and the median for the college is 207 cu. in. The medians of all three Central School groups were superior to those available for comparative purposes, from the examinations made of college women by Wayman,[70] Gould and Lockhart,[54] and Herriott.[56]

d. Strongest Grip.—The median grip for Group I, on its entrance to the school, was 4 kilograms greater than for Group II; and 7.5 kilograms greater than for Group III.

Medians at graduation: Group I, 37 kilos.; Group II, 32.9 kilos.; Group III, 32.6 kilos.

Number of women in each group who graduated with a grip of 34 kilograms, or greater: Group I, 19; Group II, 11; Group III, 10. In Wayman's[70] study of data from seven women's colleges, she found the mean grip to be 60 pounds (27.2 kilos.). She gives the mean of the freshman class (Barnard College, 1931) to be 69.08 pounds (31.34 kilos.). The three groups of Central School graduates were, therefore, superior in grip strength to the average college student.

Hastings,[21] and Rogers[64] consider strength of grip as highly diagnostic of general muscular strength, function, and neural control. Hall[55] refers to Kline's conclusion that the available power of a sudden squeeze is in proportion to the habitual power and energy of mental power and activity. Doll[12] mentions that Smedley, Carmen, Wallen, Dawson, and Goddard have found positive correlation between strength of grip and intelligence.

Vital capacity and strength of grip are both classed as psychophysical tests. In these tests, Group I showed the most marked superiority, and Group III was the most inferior. From the current year's statistics at Russell Sage College, the vital capacities and grip strength of 317 college students show a correlation of .60 with an exceedingly small P.E. of .02.

e. Sub-costal Angle.—The sub-costal angles of Group I were greater on entrance to the school, but Groups II and III gained sufficiently to give the measurement little significance at graduation.

f. Total Strength.—The scores of Group I on entrance to the school excelled those of Groups II and III (in all quartiles) in total strength by 14 to 31 kilograms. At graduation, the scores of Group I were higher in only the third quartile. The median scores of Groups II and III were superior, as were also the scores in the first quartile. However, when total strength is considered, a few kilograms difference is not very significant. Medians: Group I, 372 kilos.; Group II, 382 kilos.; Group III, 376 kilos. No comparative statistics on total strength were found.

g. Type of Breathing.—Measurement of the use of the chest, by the judgment method used by the Central School, is not made by any other school of which the investigator has knowledge. Vital capacity

was not considered sufficiently diagnostic of peculiar defects in the use of the chest, and hence this method of evaluation was devised. The most significant thing in this study of type of breathing was the great superiority (shown by grade) of the members of the first group over the second and third groups when they entered the school. All three groups had approximately the same grade at graduation.

h. Posture.—Group I averaged considerably higher (in grade) on entrance to the school, and was slightly superior to Groups II and III at graduation.

Methods of grading posture are too unstandardized to make any comparisons valuable. The literature of physical education is filled with discussions of the value of good posture to health, physical efficiency and proficiency, mental attitudes, and success in life. Reference is made to such statements by Thomas and Goldthwait,[38] Bancroft,[4] Drew,[13] Brown,[7] Goldthwait,[20] and Mosher.[26]

i. Weight.—The measures of central tendency of weight (for height and age) of the three groups show Group II and III to more nearly approximate the normal than does Group I. From an intimate knowledge of the members of the three groups, Group I contained a considerable number of cases where physique type was a factor that should have been considered in estimating normal weight.

j. Physical Condition.—The method of securing a total grade in physical condition, in terms of the anthropometric and orthopaedic examination, is unique with the Central School. Wayman[71] most closely approximates it, but her method of grading and the abilities evaluated are very different.

Physical condition, as thus determined, is a measure of physical efficiency; and proficiency is properly shown by tests of motor ability and motor achievement. Wayman[70] states in this connection that, "Too much attention has been paid in the past to emphasizing motor ability, and not enough to improving physical condition" and she further comments on the use of the term "physical efficiency" when "physical proficiency" is what is really being measured.

Group I was physically superior in every test and measurement (except weight) when it entered the school, and it excelled Groups II and III at graduation in all tests and measurements save for slight exceptions in sub-costal angle measurements, total strength, and weight.

Class ranks in physical condition, at graduation, show twelve of Group I, and two of Group III to be in the upper quarter; while five of Group I, and twelve of Group III were in the lowest quarter.

Comparing the school estimates of physical condition with those of employers, all members of Groups I and II were ranked by employers in the upper half of the classification; but eight members of Group III were ranked in the lower half.

3. Knowledge of Subject Matter

In academic averages, Group I had the highest, and Group III had the lowest. Class ranks make the difference between the three groups even more apparent.

Number of students in each group that were ranked by the school in the upper half of their classes: Group I, 22; Group II, 20; Group III, 15.

One-third of Group II, and one-half of Group III were ranked in the lower half of their classes.

These class ranks were closely paralleled by employers' ranks, but the latter were more generous.

In the White House Conference Report[72] previously mentioned, "inadequate professional training" was cited as a primary or contributing cause of failure of teachers of physical education, by 98.3 per cent of the experts consulted.

No studies of the scholarship of physical education students were found by the investigator.

Among the many studies of success and failure of teachers of general school subjects, Wagenhorst[41] concludes that superintendents take great chances when they select graduates (as teachers) who were low in scholarship.

Almy and Sorrenson[45] found academic and teaching grades correlate .49.

4. Skill in Performance of Physical Activities

Group I was superior to the other two groups in average grades; and Group III was the most inferior, but in class rank, Group II excelled Group I.

Employers ranked all three groups higher than they were rated by the school, but gave first place to Group I.

No studies could be found of the contribution made to teaching success by particular, individual excellence in physical skills. "Poor performance in usual activities" was scored by 88.8 per cent of the experts, in the White House Conference Report, as a primary or contributing factor in failure of teachers of physical education. It is generally assumed that teachers of physical education must have more than average skill in activities, but exceptional skill is certainly not stressed by many schools as the greatest factor in success.

5. Teaching Skill and Power

Group I surpassed Group II; and Group III was the lowest both in grades, and class rank in practice teaching.

Number of women who ranked in the upper half of their classes in practice teaching: Group I, 24; Group II, 20; Group III, 12.

Number of women who ranked in the lowest quarter in practice teaching: Group I, 2; Group II, 5; Group III, 13.

Employers ranked all members of Groups I and II as being in the upper half of the classification; but gave upper-half rating to only two members of Group III.

No studies were found concerning the validity and reliability of practice-teaching grades of physical education students as prophetic measures of success in actual teaching.

Ullman[69] considers success in practice teaching to be the best single measure of teaching success.

6. Character and Personality

Grades have little significance in this evaluation since different methods were used during the ten-year existence of the Central School. In class ranks, however, the difference between the three groups is startling.

Number of women ranked in the upper half of their classes while they were in school: Group I, 23; Group II, 19; Group III, 10.

Number ranked in the upper quarter: Group I, 15; Group II, 6; Group III, 2. Many studies have been made during the past decade of the qualifications, abilities, and characteristics of the successful and unsuccessful teacher. In Kelly's[23] investigation conducted by the executive and administrative officers of 187 colleges, 73 colleges considered character and personality were the greatest requisites to success in teaching. Hill and Hutson[27] comment on the selection and retention of students in training schools on the basis of scholarship, in spite of the fact that studies of teacher failures indicate that teachers are rarely dismissed for lack of scholarship, but almost always for weakness in character and personality.

In a comparison of the studies of Charters and Waples,[9] Almy and Sorrenson,[45] Flory,[17] Newmark,[29] and Kelly,[23] every one of the five lists of characteristics of successful teachers ranks "sympathy" exceptionally high. "Poise and control" are given high rank by Charters and Waples and by Newmark. "Unselfishness," "impartiality," "initiative," "self-confidence," "cooperation," "interest in students," and "trustworthiness" are among the qualities given special emphasis as being important to success.

Convincing proof of the causes of success and failure of the three groups of Central School graduates is offered by the grades given them by employers, in the very characteristics cited, as of such importance, by these other investigators of teacher success and failure.

Mead[62] concludes that "Practically all of the serious defects in personal qualities are among the poor teachers." This contention is corroborated by the findings of this study.

Group I was graded by employers as unusual in all positive qualities,

characteristics, and abilities. No human beings could be as perfect. The teachers of this group were poised, responsible, industrious, ambitious, cooperative, loyal, and unselfish, and had high professional standards and objectives.

The members of Group II were honorable, loyal, cooperative, industrious, and responsible, but they lacked the spark of initiative; a far-sighted view of their profession; and self-confidence to attempt new

	Group I	Group II	Group III
Sympathy and understanding	94.1	80.8	59.1
Initiative	95.8	77.	57.7
Self-control	99.1	82.5	74.1
Unselfishness	98.3	85.8	75.
Cooperation	96.6	90.	74.1
Self-confidence	94.1	78.	76.6
Personal appearance	97.5	90.8	84.1

things and work in new ways. They evidently did well such work as was given them to do, but they lacked the essential and positive qualities of leadership.

The girls of Group III had so many serious defects in personal qualities they were rated very low as teachers, although, be it remembered, they were all holding teaching positions and did not, in all other of the five classifications except character, show such a marked inferiority as compared with the other two groups. The teachers of this group were apparently honest, cultured, loyal, and were particular about their appearance. These girls lacked vision, initiative, ambition, and high professional standards. They were above all lazy, uncontrolled, and irresponsible, and lacked sympathy with or understanding of any point of view but their own. Considering the individuals in this group, from the intimate school knowledge of them, they were always individualists. They did their work with average grades, but were never leaders in any constructive sense. Thirteen of the group were rated particularly low by employers in the same characteristics that were brought to their attention again and again while they were in training. The outstanding characteristic of practically every member of the group, during her school course, was an attitude of superiority to suggestion and criticism, and a persistent continuance in doing the things in the way she wished regardless of advice and suggestion. This group as a whole represents a type of young woman too frequently found today who considers herself free to lead her life as she sees fit, and who usually puts her personal desires and pleasures first. She is a time-server on the job, and an individualist always. A few colleges have made character evaluation of students in training that are very comparable to the methods used by the Central School. LaPorte,[24] and Norris[30] have done outstanding work in this field.

From an interpretation of the findings of this study and a comparison of the results with those of other investigators, the following conclusions are drawn:

1. Teacher-training institutions, for general as well as for special teachers, are emphasizing the importance of more careful selection of candidates.

2. Such selection is to be based upon scholarship, qualities of character and personality, and physical condition.

3. Schools are recognizing their responsibility for the development in students of qualities of character and leadership.

4. Measures of efficiency of teachers in training are being universally sought.

5. Measures of predicting potential teaching success are considered to be greatly needed.

6. The responsibility of a school for a follow-up of its graduates in the field is being stressed.

7. Psychologists, physicians, and research workers are making use of anthropometric tests and measurements.

8. Experts in physical education are quite universally discarding these same tests, and concentrating their efforts on measures of motor ability, and achievement in skills.

9. The health of women teachers of physical education is questioned, and it is advisable that schools for the training of teachers develop some means of evaluating the physical fitness of their students in training that shall estimate more than negative health (freedom from disease) and motor skill.

10. The need is obvious for a re-evaluation of all tests and measurements of physical traits, and for cooperative effort in the endeavor to find some combination of tests that will give an estimate of physical vigor, vitality, and endurance.

11. A sufficient number of able investigators have found correlations between physical indices and mental capacity to warrant continued search for a physical basis for intelligence, or for qualities of leadership.

12. Many attempts are being made to evaluate the character and personality of teachers in training, and from the numerous research studies and the methods being tried, some adequate measure may soon be discovered.

13. The methods used by the Central School seem to have been proven as successful as any others now in use.

GENERAL SUMMARY AND EDUCATIONAL IMPLICATIONS

A comparison of the grades and ranks given the three groups, while they were in training, with the ranks given them by employers, shows a surprising similarity.

The employer ranking of all three groups was higher than the school estimate in physical condition, theoretical knowledge, practical skill, and even in technical teaching ability. The failure of the members of Group III, and the weakness of Group II were attributable to character and personality defects. These defects were noted while the students were in training, and every effort was made to impress upon the student body, and upon each individual, the necessity for correction of defects and the strengthening of weaknesses before teaching was commenced. The deduction seems obvious—that a school should question its kindness to individuals, and its loyalty to the profession when it graduates young women (or young men) who are known to be weak in character and personality, even though they are good students and strong in skills.

The evaluation of all the abilities considered in this study seems to the investigator to throw light upon the condition and development of students; and to have prognostic values that are suggestive to the faculty of a training school. In practice and application, any method of evaluation that is based upon detailed analysis of student ability, which, in turn, is founded upon intimate, personal knowledge of individual students, cannot but give valuable returns.

CONCLUSIONS IN TOTO

In conclusion, the following deductions and educational implications seem justified by this study:

1. Sterling character, and forceful and pleasing personality are indispensable factors to success for the teacher of physical education.

2. Thorough preparation in theoretical subjects, or an adequate knowledge of subject matter, is second (only) in importance to character and personality.

3. Excellent physical condition, as well as positive health, is of the utmost importance.

4. Personal skill sufficient for the demonstration of all usual physical education activities is necessary, but unusual ability is not essential to successful teaching.

5. Without demonstrated ability to organize and lead group activities, and to instruct in the techniques of physical education, no student should be graduated from a school of physical education.

6. Physical superiority, as shown by anthropometric tests and measurements, is an excellent basis for the selection of candidates for training in physical education.

7. The school that considers a candidate eighteen years of age, or older, who is not well-developed (as shown by anthropometric tests and measurements) is taking a chance, both from the point of view of the student and of the profession, in accepting her for training.

8. Training schools should make every effort to know their students

from every point of view, and to evaluate for the students as well as for the recorder's office, each and every measurable aspect of their fitness for teaching.

9. A training school should consider its work is but begun when it graduates a student. It should follow her in her teaching positions, which should in large measure be found for her by the school, and promote her as her ability warrants. It should stimulate strong teachers to continued study of a research nature, and attempt to locate weaker graduates in positions where only good routine work is demanded of them.

10. The Central School has, through its methods of evaluating the actual and potential ability of its students, taken its first steps toward solving the problems of adequately preparing them for success in the profession of physical education.

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Variations in Metabolic Levels as Shown by Oxygen Consumption of Football Athletes Throughout a Playing Season*

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CONFLICTING statements and interpretations have appeared concerning the degree and the direction of energy exchanges which take place when an athlete undergoes a period of training. Bainbridge[1] has suggested that the real value of physical exercise lies mainly in its stimulating effect on the metabolism of the muscle cells of the body. Schneider and Foster[2] have made an effort to determine whether basal metabolism is accelerated, retarded, or unaltered by an interval of training.

The results of a series of experiments showed that seven of nine athletes (football three; swimming four; basketball two; cross-country one) experienced a lowered basal metabolic rate while in training; in one there was no material difference; one showed an increase in rate. In the case of non-athletes, during a period of moderate training, two of the three subjects showed a raised, and one a lowered, rate. From these observations it is apparent that individuals differ markedly in metabolic rate while undergoing physical training.

To interpret these findings Schneider and Foster assumed that in the case of increased rate the mass of active muscle tissue is increased by reason of muscular activity in advance of any increase of cellular efficiency. On the other hand, when improvement in cellular efficiency surpasses the effect of the increase in bulk of muscle tissue, the rate is lowered. When these two factors balance each other the metabolic rate is unchanged.

While the above reasoning seems to reconcile some of these conflicting data, certain observations in this laboratory on the active metabolism of athletes during a period of training interspersed with intervals of varsity competition make it appear that psychic stimulations

*Certain aspects of these data were reported before the Society for Experimental Biology and Medicine at Pullman, Washington, June, 1932.

[1]F. A. Bainbridge. *The Physiology of Muscular Exercise.* London: Longmans, Green and Co., 1923.

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produce widely variable metabolic levels which are probably accompanied by corresponding changes in basal metabolic rate. Through the cooperation of the Director of Athletics,[3] the Physical Education Department,[4] and certain athletes at the University of Southern California, experiments have been conducted to obtain indices of changing metabolic levels during the football season.

All of the metabolic tests were made using a portable Sanborn Graphic apparatus. The equipment was set up in the gymnasium in a room adjoining the varsity training quarters. Care was taken that quiet was maintained at all times. Tests were made in mid-afternoon just prior to football practice periods on various days during the season. On these days the subjects relaxed in a supine position on a comfortable couch for fifteen minutes while the routine procedures for the tests were carried out. Records of changing body weights, pulse rate, and systolic blood pressure were kept. On the Saturdays when games were being played on the home field, apparatus was carried to the team's dressing room at the stadium. When possible tests were made before the games, as well as those made regularly afterward.

Data were gathered from four subjects, two varsity players (G.S. and S.W.) who participated regularly in the contests, and two who played less frequently (G.C. and A.P.), the latter serving as controls. All were familiar with the purpose of the experiments and the methods used. Determinations of metabolic rate of each of the subjects under the usual post-absorptive and resting conditions were carried out early in the football season and again about two months after the season's close. The metabolic levels of each subject fell within $\pm$ 10 per cent of the Sanborn normal standards.

Although individual differences appear, as may be expected from the operation of various extrinsic and intrinsic factors, the data obtained (Table I) show that the varsity players usually reached higher and higher daily metabolic levels as the time for critical games approached. As the season progressed and the competition became keener, these players reached slightly higher metabolic levels before each of the successive games. These observations suggest that intense psychic stimuli have raised not only the active metabolic rate but also the basal rate as well. In the case of the substitute players who served as controls the day-by-day increase was present but less pronounced, and the increase throughout successive weeks was very slight. These characteristic variations are evident in the accompanying plots which show the per

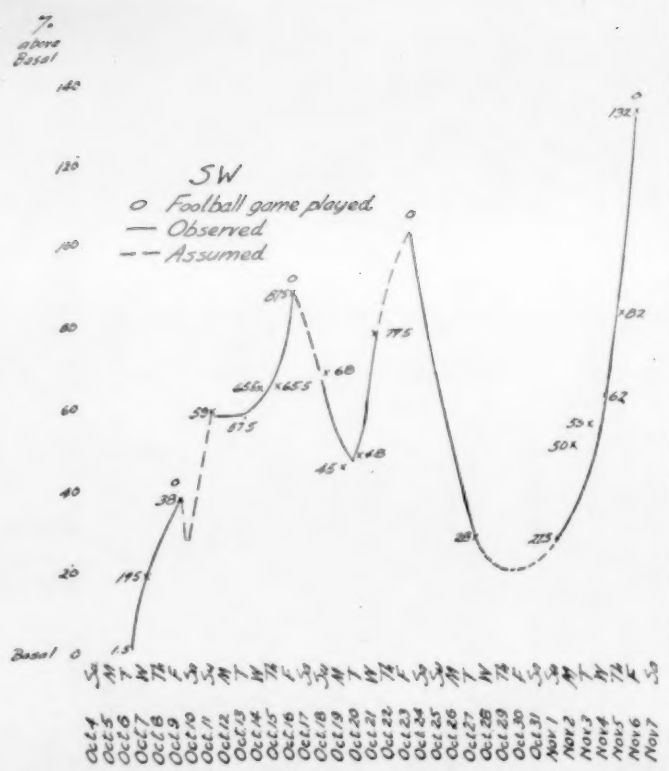
[3]The writers wish here to acknowledge the special courtesies extended by Director Willis O. Hunter and Coach Howard Jones for their hearty cooperation in making possible the taking of records at the stadium before and after games.

[4]Special thanks are also due to Professor William R. LaPorte for courtesies extended during the weeks of observations and for his sustained interest in the results herein reported.

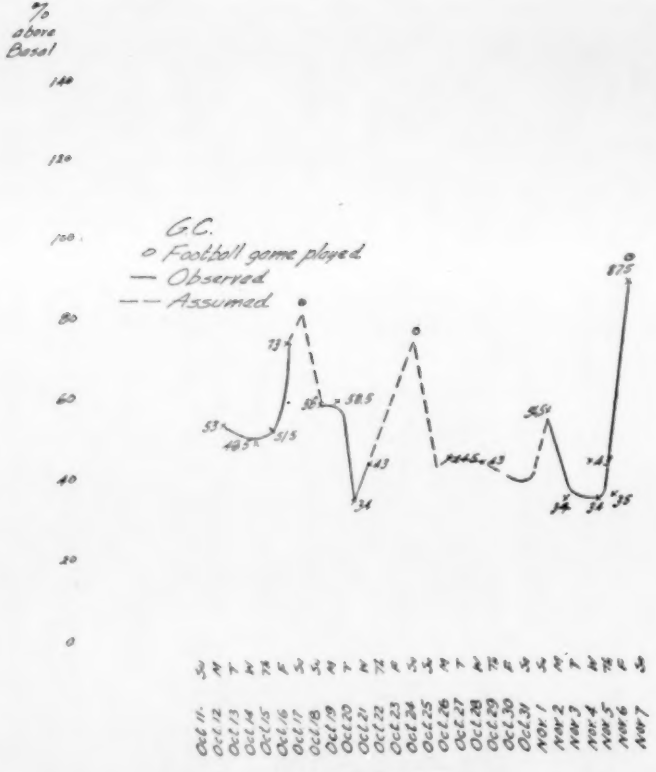
TABLE I

Metabolic Exchanges of Football Athletes as Measured by Oxygen Consumption

Date	Day of Week	Time of Day	Subject	Height (Inches)	Weight (Pounds)	Basal O_2 Consumed (cc. per min.)	Actual O_2 Consumed (cc. per min.)	Condition	Game	Time Played (Minutes, Seconds)
Oct. 2	Friday	3:00 p.m.	G.S.	71	187	265	499	Cold in head—nervous		
		3:15 p.m.	S.W.	72.5	197	276	292	Composed		
Oct. 3	Saturday	5:15 p.m.	S.W.	72.5	194	274	422	Tired	Oregon State	40′ 30″
Oct. 7	Wednesday	3:00 p.m.	S.W.	72.5	197	276	280	Composed		
Oct. 8	Thursday	3:15 p.m.	S.W.	72.5	195	275	330	Composed		
		3:30 p.m.	A.P.	74	201	282	363	Composed		
Oct. 10	Saturday	1:00 p.m.	S.W.	72.5	197	276	380	Nervous	Wash. State	
		5:15 p.m.	S.W.	72.5	192	273	430	Excited		44′ 20″
Oct. 12	Monday	3:15 p.m.	S.W.	72.5	197	276	339	Composed		
		3:30 p.m.	A.P.	74	203	283	363	Composed		
Oct. 13	Tuesday	3:15 p.m.	S.W.	72.5	198	277	390	Quiet		
		3:30 p.m.	G.C.	71	171	256	392	Composed		
Oct. 14	Wednesday	3:15 p.m.	S.W.	72.5	200	278	432	Composed		
Oct. 15	Thursday	3:00 p.m.	G.C.	71	171	256	380	Composed		
		3:15 p.m.	S.W.	72.5	199	277	462	Quiet		
		3:30 p.m.	A.P.	74	202	283	370	Composed		
Oct. 16	Friday	3:00 p.m.	G.C.	71	172	256	388	Composed		
		3:15 p.m.	S.W.	72.5	201	279	463	Excited		
		3:30 p.m.	A.P.	74	201	282	378	Quiet		
Oct. 17	Saturday	1:00 p.m.	S.W.	72.5	199	277	520	Nervous	Oregon Univ.	
		4:25 p.m.	S.W.	72.5	193	273	650	Relaxed		31′ 35″
		4:55 p.m.	G.S.	71	188	265	1150	Tired		28′ 5″
		5:15 p.m.	G.C.	71	170	255	440	Excited		20′
Oct. 19	Monday	3:00 p.m.	S.W.	72.5	195	275	462	Nervous—muscle soreness		
		3:15 p.m.	G.C.	71	170	255	393	Quiet		
Oct. 20	Tuesday	3:00 p.m.	S.W.	72.5	199	277	397	Composed		
		3:25 p.m.	G.C.	71	173	257	407	Composed		
		3:40 p.m.	G.S.	71	185	264	367	Very Quiet		
Oct. 21	Wednesday	3:15 p.m.	S.W.	72.5	198	277	409	Composed		
		3:00 p.m.	G.S.	71	185	264	422	Composed		
		3:30 p.m.	G.C.	71	173	257	344	Excited		
Oct. 22	Thursday	3:00 p.m.	S.W.	72.5	199	277	490	Excited		
		3:15 p.m.	G.C.	71	173	257	367	Excited		
		3:30 p.m.	G.S.	71	186	264	444	Excited	(Univ. Calif. Berkeley)	
Oct. 27	Tuesday	3:00 p.m.	G.C.	71	174	257	370	Relaxed		
		3:15 p.m.	G.S.	71	185	264	380	Composed		
Oct. 28	Wednesday	3:00 p.m.	G.S.	71	185	264	500	Cold in head		
		3:15 p.m.	S.W.	72.5	198	277	354	Composed		
Oct. 29	Thursday	3:00 p.m.	G.S.	71	187	265	486	Nervous		
		3:15 p.m.	G.C.	71	174	257	360	Composed	No game	
Nov. 2	Monday	2:00 p.m.	S.W.	72.5	198	277	352	Composed		
		2:15 p.m.	G.C.	71	174	257	393	Composed		
Nov. 3	Tuesday	2:15 p.m.	S.W.	72.5	202	279	411	Quiet		
		2:30 p.m.	G.C.	71	172	255	344	Composed		
Nov. 4	Wednesday	2:00 p.m.	A.P.	74	202	283	373	Composed		
		2:15 p.m.	G.C.	71	174	257	363	Composed		
		2:30 p.m.	G.S.	71	187	265	393	Composed		
		2:45 p.m.	S.W.	72.5	202	279	432	Composed		
Nov. 5	Thursday	2:00 p.m.	S.W.	72.5	202	279	452	Excited		
		2:15 p.m.	G.S.	71	186	264	565	Very excited		
		2:30 p.m.	G.C.	71	174	257	344	Quiet		
Nov. 6	Friday	2:15 p.m.	G.C.	71	176	258	349	Composed		
		2:30 p.m.	S.W.	72.5	203	279	508	Composed		
		2:45 p.m.	G.S.	71	188	265	392	Excited		
Nov. 7	Saturday	4:45 p.m.	S.W.	72.5	198	277	646	Rib injury	Stanford U.	54′
		5:00 p.m.	G.S.	71	180	261	765	Excited		49′
		5:15 p.m.	G.C.	71	171	256	480	Composed		14′ 10″
Nov. 9	Monday	2:00 p.m.	A.P.	74	203	283	363	Composed		
		2:15 p.m.	G.C.	71	176	258	304	Composed		
		2:30 p.m.	G.S.	71	183	263	334	Composed		
Nov. 10	Tuesday	2:00 p.m.	G.C.	71	176	258	342	Composed		
		2:15 p.m.	A.P.	74	203	283	354	Composed		
Nov. 12	Thursday	2:00 p.m.	G.C.	71	176	258	373	Composed		
		2:15 p.m.	A.P.	74	202	283	393	Back injury		
		2:30 p.m.	G.S.	71	185	264	398	Cold in head		
Nov. 13	Friday	2:00 p.m.	A.P.	74	203	283	360	Composed		
		2:15 p.m.	G.C.	71	176	258	430	Excited		
Nov. 14	Saturday	5:15 p.m.	G.C.	71	170	254	550	Tired	Montana	12′
Nov. 16	Monday	2:00 p.m.	G.C.	71	175	258	400	Composed		
		3:30 p.m.	S.W.	72.5	202	279	400	Composed		



PLOT I



PLOT II

Variations in the metabolic rate of subject G. C. expressed in terms of percentages above the calculated basal level.

cent above basal rate in subject S.W. (plot I), a varsity athlete, and in G.C. (plot II), a substitute player. The observations on the other subjects, although less numerous, bear out the above observations.

Such persistent daily increases as well as the total rise during the six-day period, November 2-7, indicate the presence of psychic (probably hormonal) stimulation. During this entire period the subjects were under strict regimen preparing for a contest with the team of Leland Stanford University, considered a formidable rival. The actual amounts of oxygen consumed by subjects S.W. and G.C. are shown in plots III and IV. These data are in general agreement with observations concerning the physiological effects resulting from emotional disturbances. The mechanism of such phenomena has been discussed extensively by Cannon.[5]

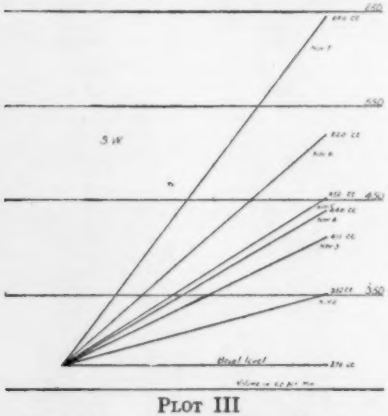
SUMMARY

1. Observations on the active metabolism of two varsity and two substitute football athletes have been made throughout a playing season.

2. The per-minute oxygen consumption of the varsity players showed day-by-day increases during the periods of preparation for critical games. Such increases were less evident in the case of substitute players.

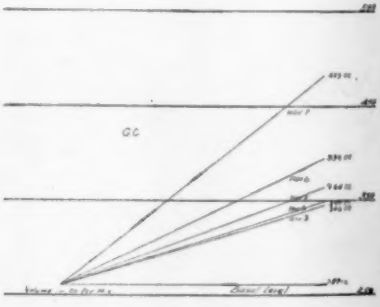
3. As the playing season progressed, the varsity players reached higher metabolic levels before each successive game.

4. These data suggest that the characteristic physiological effects of emotional disturbances are responsible for widely variable metabolic levels in athletes under competitive conditions.



PLOT III

Per-minute consumption of oxygen by subject S.W. on the days preceding the football game played November 7.



PLOT IV

Per-minute consumption of oxygen by subject G.C. on the days preceding the football game played November 7.

[5] W. B. Cannon. *Bodily Changes in Pain, Hunger, Fear, and Rage.* New York: D. Appleton and Co., 1929.

Personal Qualities of Women Teachers of Physical Education

Their Relation to the Problem of the Guidance of the Prospective Teacher*

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CHAPTER I

THE PROBLEM OF THE PRESENT STUDY

THE PROBLEM of the present study is basic to the scientific construction of requirements for both the admission and certification of prospective teachers of physical education as well as to the application of a wise guidance program. Before teaching success can be predicted it is necessary to know about teachers who have been successful and those who have not been so successful in the actual teaching of physical education. It is evident, however, that an inquiry into all of the characteristics which need to be known about teachers of physical education such as motor ability, skill, health, intelligence, and personality would constitute too immense a task for a single study. The present study is confined to an investigation of certain non-academic characteristics.

The problem of the present study is to diagnose certain personal qualities of women teachers of physical education, and, in so far as is possible, to relate the measures used in this analysis to teaching success in physical education.

The problem may be stated in the form of a series of questions:

1. During secondary school did the physical education activities of the most successful teachers differ from those of the less successful teachers?

2. Were there differences in the positions of leadership held in secondary schools by the most successful teachers and the less successful teachers?

3. Is *early interest* in teaching physical education related to success in teaching physical education?

4. Did the most successful teacher or the less successful teacher *select* the profession of teaching physical education at an earlier age?

5. Does the application of the Bernreuter Personality Inventory aid in the discovery of differences between the two groups?

*A part of a dissertation presented for the degree of Doctor of Philosophy in Yale University.

a. Are there significant differences in emotional stability?

b. Is one group more self-sufficient than the other?

c. Does introversion-extroversion appear to be related to the qualities of either group to any significant degree?

d. Does dominance appear to be a characteristic of either group?

6. Does the Morris Trait Index L or any of its sections differentiate between the most successful and the less successful teachers of physical education?

7. Does the measurement of interests, as measured by "A" Interest Blank used in the present study, offer a procedure by which one may differentiate between the most successful and the less successful teachers?

ASSUMPTIONS MADE IN THE PRESENT STUDY

The following assumptions are made in the present study:

1. That the newest and youngest teachers, those who have had from one to six years' teaching experience, have encountered situations which are both representative of and sufficiently comparable to those situations which teachers of physical education will be meeting for the next five, ten, and fifteen years to permit conclusions to be drawn for purposes of guidance which are based upon the reactions of these present teachers.

2. That, although great allowance must be made for individual variation in personal qualities, group tendencies are valuable for purposes of educational and vocational guidance.

3. That the department of physical education in the college and university or the faculty of the teacher-training institution is responsible for acquainting prospective teachers of physical education with information concerning the personal requirements for teachers of physical education which is based as far as possible upon scientific analysis and study.

4. That such a program of educational and vocational guidance should be operative prior to the teacher-training period.

5. That measure or factor which differentiates between the most successful and the less successful teacher of physical education in the field will be valuable for purposes of guidance and the prognosis of teaching ability.

CHAPTER II

THE DATA AND METHOD

Selection of Teachers Used in This Study.—This study is arbitrarily limited to teachers of physical education who have graduated from their respective teacher-training institutions in the classes of 1926, 1927, 1928, 1929, and 1930. The reasons for the selection of teachers who graduated during this five-year period as subjects for this study are as follows:

1. The most recent graduates of teacher-training institutions may be expected to be representative of the best practices of modern physical education teacher-training curricula.

2. Graduates of this recency from the modern high school, i.e. 1922–1928, are apt to have had the opportunity to participate in a number of extra-curriculum activities during their high school careers.

3. The reactions and experiences of these younger teachers in the field of physical education are not so far removed from the experiences of pupils in the secondary schools nor from the present-day social and economic order, as to prevent conclusions from being drawn from their experiences which are applicable to the problem of guidance.

4. The restricted selection of these teacher-training graduating classes automatically gives a relatively narrow age range to the subjects studied. This is desirable since two of the measures used in this study, the Bernreuter Personality Inventory and the Interest Blank, might be affected by the breadth of age range.

5. The teaching ability of the newest teachers in the field is probably analyzed more objectively or at least more definitely by administrators and supervisors than was done ten or more years ago. This is particularly true during present financial conditions and since many of the teachers cooperating in this study have not yet attained permanent tenure.

Teachers Used in This Study.—Two hundred seventy-four teachers furnished data for this study. From this number fifty pairs of teachers were selected and matched upon the basis of their teacher-training institution and the year of their graduation from that institution, i.e.—Pair Number I are graduates of the same institution in the same class —"A" is most successful and "A-1" is less successful in her teaching. These fifty pairs of teachers have been matched in this manner so that as far as possible the factor of variability in the quantity and quality of undergraduate professional training is equated. For, if differences in undergraduate professional training are minimized, then their difference in position on the success scale of teaching ability in physical education cannot be attributed to a mere difference in their professional background or their knowledge of physical education.

The Test Envelope.—The envelope which was sent to each teacher who cooperated in this study contained the following blanks:

1. "A" Interest Blank for Women (Constructed by the writer)
2. Morris Trait Index L*
3. Bernreuter Personality Inventory†
4. Personal Data Blank (Constructed by the writer).

Evaluation of Each Teacher's Ability to Teach Physical Education.—As soon as the test envelope had been returned to the writer a rating scale was sent to two or more of the teacher's administrative superiors. In the case of the college teacher this was the director of the physical education department, the dean, the dean of women, or the president of

*Published by Public School Publishing Co., Bloomington, Illinois.
†Published by Stanford University Press, California.

the college; for the secondary and elementary teacher the scale was sent to her principal, superintendent, or special physical education supervisor. For each teacher an attempt was made to secure evaluations of her success in her current or last position and also for preceding positions where there were any. No teacher is used in this study for whom the writer does not have at least three ratings of her ability to teach physical education. If any of these three evaluations were not in agreement as to whether the teacher was successful or average or below, that teacher's data were not used.

A very simple man-to-man rating scale has been used in this study. No attempt was made to break up teacher success into smaller units such as ability to discipline, health, perseverance, loyalty, or other like factors, since many studies have shown the probability of the general halo effect of such evaluations. As a matter of fact, it was felt that the type of evaluation which would be of value for this study was one which would indicate the administrator's general estimate of the teacher. This general scale evaluation is in keeping with the conclusions of recent studies regarding the use of the rating scale. For example:

> "Rating devices with few items to be scored will give higher reliability than the case of rating forms with a large number of items . . . . . We conclude that a simple rating device seems to assure greater predictive accuracy than a more complicated one."[1]

That the validity of the rating scale criterion of teaching success is open to question the writer is well aware. A criterion which involves an objective method for determining the effectiveness of the teacher of physical education may be discovered some day, but until that time arrives the subjective opinion of employers and administrators must serve that purpose. Often this subjective judgment when recorded on a rating scale and filed in an administrator's office causes the teacher to lose or retain her position according to the rating. Furthermore, at the present stage in measurement when objective measures in terms of amount are not fully applicable to determining the degree to which a given characteristic or group of characteristics is present in a certain situation then the opinion of competent judges must be resorted to either wholly or in part. This method is the basis for practically all social measurement. Since this is true, the writer feels justified in using the rating scale as a means of classifying the teachers used in this study.

The writer had hoped to contrast those teachers whose ratings indicated that they were good or excellent teachers or above average with those teachers whose ratings were below average or fair or poor. However, several factors seemed to be at work to make the administrator leni-

[1]N. L. Bossing, "Teacher Aptitude Tests and Teacher Selection," *Research in Higher Education*. Office of Education, Department of the Interior Bulletin Number 12, 1931, p. 125.

ent in his judgment.[2] That there was a tendency in many administrators to protect the poorer teacher was indicated by the number of average ratings obtained. Certain scales were checked "average" when it was known to the writer that the teacher had lost her position because of unsatisfactory teaching. Perhaps the very construction of the scale on a vertical line had a tendency to make the administrator hesitate to place a check below the middle or average rating. Purposely the letter which accompanied the rating scale paid tribute to the kindness and courtesy of the teacher on whom rating was requested. This was done because the writer wished to be very cautious lest she in any manner injure, even by suggestion, the position of any teacher who had cooperated in this study. Whatever the factors which were operating, the result was that many of the teachers who had been preliminarily classified as "least successful" in the teaching of physical education were rated as "average" or often above average. The writer has used the data of those teachers who were rated as "average," "fair," or "poor" by three or more judges in this study, and has designated them as the "less successful" group of teachers. Thus it is necessary to appraise the present study as an investigation of the personal qualities of teachers who have been most successful in the teaching of physical education and of those who have been less successful in the teaching of physical education.

Reliability of the Data.—The writer has been impressed during the progress of this study with the cooperative spirit shown by the teachers who responded to the requests which were made. Numerous personal notes and letters gave information beyond that which was sought on the data blanks and served to confirm the interest of the teachers in the study. All of the data collected were given voluntarily by the teachers of physical education. Each teacher was assured that no personal reference would be included in the report of the study and that the information which she gave would never be used in any personal manner. The history and addresses of positions and employers were without an exception found to be accurate. The completeness of the data furnished together with these other conditions makes it evident that the teachers with few exceptions gave their full cooperation and accurate reactions in so far as they were able. Such factors argue for the reliability of the data used in the present study.

Validity of the Data.—It is each teacher's testimony concerning her own behavior which furnishes the most important data used in the present study. Although the method of verbal diagnosis has demonstrated its usefulness in many preceding studies it is realized that its validity depends upon the honesty and the ability of the cooperating teachers for self-observation. Since, as has been previously emphasized, all information

[2]N. Kneeland, "That Leniency Tendency in Rating," *Personnel Journal*, VII (1928–29), p. 356–366.

was furnished voluntarily and the subjects understood the impersonal nature of this investigation, there is every reason to believe that the subjects did cooperate fully and with the best of intentions. The internal consistency of the data corroborates the veracity of the responses given by the teachers.

Adequacy of the Sampling.—One criterion for a study which aims to achieve any general significance is that its inferences must be drawn from both a representative and a random sampling. Evidence of the operation of this criterion is found in the fact that nineteen college teachers, forty secondary teachers, and forty-one elementary teachers compose the group of matched teachers used in the present study. These teachers have a wide and varied geographical distribution. They are located in twenty-four states of the United States, in rural communities, and in the largest cities of the country.

Further proof of the operation of the criterion of random and representative sampling is offered when one considers that the one hundred teachers are the graduates of twenty physical education teacher-training institutions. These institutions are established in seventeen different states.

CHAPTER III

THEORY OF MEASUREMENT FUNDAMENTAL TO THE PRESENT STUDY

The Approach to the Problem.—Man is forever lured and intrigued by the mysteries and intangible qualities of human beings which are labeled as "Personality." Having once coined the term, personality, man has been prone to conjoin to it a myriad of connotations. As a consequence anyone who uses the term, personality, needs to define it if he wishes his interpretation of the word to be understood. For this reason, the term, personality, has not been used previously in this study. However, the use of the term can no longer be avoided since it must be admitted that the personal qualities investigated in the present study are a part of a larger whole which is most commonly conceived of as personality. It is not within the scope of the present study to enter into a discussion or review of the various concepts of personality.

It is obvious, however, that this study is not based on such a conception of personality as that postulated by Hume who considered personality as the unanalyzable force or entity of the individual which integrated him.[3] Such a conception of personality would effect an intellectual impassé. Instead, the present study subscribes to the views held by such psychologists as Thorndike, Watson, Allport, Thurstone, and many others, who believe that the personality of human beings is amenable to analysis and diagnosis. Of some twenty different definitions of person-

[3]D. Hume, *A Treatise on Human Nature*, Oxford: Clarendon Press, 1896, 709 p.

ality which were presented recently by as many leaders in the fields of psychology, sociology, and psychiatry there is not one which does not define personality by describing it in terms of reactions, using such descriptive terms as behavior, habits, traits, responses, attitudes, and the like.[4] Typical definitions are:

"Personality is the integration of those systems of habits that represent an individual's characteristic adjustments to his environments."[5]—G. W. Allport.

"By the term 'personality' is meant the sum total of the reactions of an individual to all of the situations which he encounters. The reactions may be physical or mental, are always expressed in some way in the behavior of the individual, and in order to evaluate personality it is necessary to study not only the exhibited behavior but the situations which precipitate or stimulate behavior."[6]—L. G. Lowery.

"Personality cannot be completely described in terms of reactions but the individual as a stimulus must also be taken into account. An individual's personality is not defined by his responses to others as much as it is by the responses which others make to him as a stimulus. In brief, personality is the individual's social stimulus value."[7]—M. A. May.

According to these definitions personality is not a mysterious and intangible entity but is conceived of as something which may be subjected to analysis and diagnosis.

The Measurement of Personality.—Recent research has aimed to escape from the uncertainties of purely subjective qualitative estimates of personality by using various measuring devices to obtain quantitative data. No attempt is made in this study to define the personality of the teacher of physical education according to psychological concepts of personality such as that of the structuralists who find personality a collection of traits or according to the functionalists who define it simply in terms of the behavior of the individual. Such is not the problem of the measurement of the personal qualities of teachers of physical education as conceived by the writer. The problem as delineated is the discovery of the number and kind of responses made to certain situations by the teachers of physical education. This procedure finds support in a statement by May:

"My own view is that traits are only convenient names given to types or qualities of behavior which have elements in common. They are not psychological entities but rather categories for the classification of habits.

"Practically all the data of character and personality studies are in reality only so many samples of different types of responses. The same is true of intelligence and educational achievement test scores. A raw test score does not tell us *how much* of a given trait or quality an individual possesses, it tells us only *how many* responses of a given kind that individual made under the conditions imposed by the test."[8]

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[4] *Proceedings of the Second Colloquium on Personality Investigation*, p. 146–155. Baltimore: Johns Hopkins Press, 1930.

[5] *Ibid*, p. 146.

[6] *Ibid*, p. 151.

[7] *Ibid*, p. 152.

[8] M. A. May, "Problems of Measuring Character and Personality," *Journal of Social Psychology*, III; 2 (May, 1932), p. 133.

Development of the Data.—In the descriptions included in the following chapter and the development of the data obtained from the teachers of physical education no assumptions are made concerning the nature of what is being measured since in no sense is there an attempt made to discover psychological entities. This study merely purports to sample certain reactions and experiences of teachers of physical education. Quoting May again:

> "There need be no confusion concerning what kind of behavior any response is a sample of, for it is a sample of that kind of behavior with which it has elements in common and these common elements are determined empirically."[9]

In the following chapter the description of the individual which is presented with each scale is developed directly in terms of the responses which the individual makes to the questions included in the Bernreuter Personality Inventory. The writer uses the term, trait, to refer to a mode of behavior which is evoked relatively consistently by the teachers of physical education throughout the variety of situations studied. This does not indicate a subscription to any one hypothesis of trait etiology.

The Method of the Psychological Questionnaire.—There are various methods which might have been used to obtain the response of the teachers of physical education. The method which is used, that of the paper and pencil verbal self-observational response, is one which has received a great deal of notice in recent studies of human behavior. Its technique is closely akin to that used for many years in the interview and in the psychological and psychiatric clinic. In collecting the data for this study the teacher was asked to record her likes and dislikes, her secondary extra-curriculum experiences, her ambitions, and many other items. In short, the psychological questionnaires used attempt to sample a number and variety of the responses of teachers of physical education. The principle of the psychological questionnaire is in harmony with the following theory advanced by Thorndike:

> "The situations and responses of a human life are obviously not haphazard. If a certain situation, call it S_1, occurs in a certain man's life, he is not equally likely to make any one of a million or more responses which a man can make. On the contrary, S_1 usually has well marked tendencies to call forth some particular response or some one of a certain few responses. The term connections is used to express these tendencies for a given situation to evoke certain responses rather than others. For S_1 to connect with R_{27} means that S_1 tends to evoke or be followed by R_{27} more often than a mere haphazard arrangement of situations and responses will allow."[10]

From the responses which the teachers of physical education made to the situations presented in the questionnaires used in this study the writer has diagnosed the personal qualities of these teachers of physical education. The significance of the trends elucidated through the use of the psychological questionnaire form the vital part of the present study.

[9] *Ibid*, p. 133–134.
[10] E. L. Thorndike, *Human Learning*, p. 4. New York: The Century Co., 1931.

CHAPTER IV

BERNREUTER PERSONALITY INVENTORY INCLUDING ANALYSIS OF THE DATA

Description of the Bernreuter Personality Inventory.—A psychological questionnaire, the Bernreuter Personality Inventory, is used in the present study. The Bernreuter Personality Inventory was selected for use, rather than any other of the several measures available, because it is so designed that several phases of personality may be estimated on the one blank. In addition it was essential to use some instrument which was economical of time in order to secure the assistance of many busy teachers of physical education. The time generally required to fill out the Inventory is from twenty to thirty minutes, although there is no time limit set.

The Bernreuter Personality Inventory may be scored with four different keys which furnish for the tested individual a score for emotional stability, self-sufficiency, introversion-extroversion, and dominance-submission. This innovation in obtaining 4 scale scores from the one blank is based upon Bernreuter's hypothesis that the behavior of an individual in a single situation is symptomatic of several traits, in varying degrees, rather than a single trait.[11] The 4 scoring keys have weighted values from plus 7 to minus 7. These values were assigned by Bernreuter according to the diagnostic value of each of the 125 questions as determined for each of the 4 traits of personality. The total score for a trait is the algebraic sum of the values which correspond to the responses made by the individual, as given by the key for that particular trait. The scales are designated by the symbols: B1-N, A measure of Neurotic Tendency; B2-S, A Measure of Self-Sufficiency; B3-I, A Measure of Introversion-Extroversion; and B4-D, A Measure of Dominance-Submission. The score range differs for each scale, the B1-N scale possessing the greatest and the B3-I scale the smallest.

B1-N. THE MEASURE OF NEUROTIC TENDENCY

Description of the Scale for Emotional Instability.—Scales for the measurement of neurotic tendencies were introduced during the World War. Woodworth's Psychoneurotic Inventory was developed at that time and was applied to enlisted men in an attempt to diagnose their ability to adjust themselves satisfactorily to military life. Woodworth's scale has formed the basis for many revisions by other experimenters who have adapted it for other ages and groups. The Bernreuter Personality Inventory was developed more directly from one of the most recent and

[11]R. G. Bernreuter, The Evaluation of a Proposed New Method for Constructing Personality Trait Tests, Unpublished Doctor's Thesis, Stanford University, 1931. By permission of the author.

thorough of the psychoneurotic scales, the Thurstone Personality Schedule.[12]

The score made on the neurotic scale is designed to indicate the individual's adjustment to her surroundings. The position of this score in relation to established percentiles and norms forms the basis for judging the adjustment or maladjustment of the individual. The Thurstones write of the scoring method used with their neurotic inventory as follows:

"There is considerable overlapping among the concepts of nervousness, emotional instability, social maladjustment, neurotic tendency, and psychopathological traits. Our central idea was to score each question with reference to social and emotional maladjustment, and it seems to be indicated that psychopathological traits are associated with the more severe forms of emotional maladjustment. There seems to be a gradation between the psychopathological traits at one extreme, though the neurotic indicators, to the more common forms of minor social and emotional maladjustment. We have assumed such a gradation and it seems to be justified by our results."[13]

In the case of the measure used in this study, the Bernreuter Personality Inventory, the description of the individual is developed directly from the responses made to the situations. Bernreuter describes the B1-N scale as follows:

"*High B1-N.*—The individual who scores high on the B1-N scale shows a tendency toward a neurotic condition. Such an individual often feels miserable, is sensitive to blame, and is troubled by useless thoughts, by shyness and by feelings of inferiority. He feels shut off from other people, he frequently daydreams, and worries both over things that have happened and things that may happen. He tends also to score low on the B2-S scale, high in the B3-1 scale, and low on the B4-D scale.

"*Low B1-N.*—The individual who scores low in the B1-N scale is an emotionally stable person. He is rarely troubled by moods, by worries, or by the criticisms of others. He is self-confident, and is a doer rather than a daydreamer. He tends also to score high on the B2-S scale, low on the B3-I scale, and high on the B4-D scale."[14]

B2-S. THE MEASURE OF SELF-SUFFICIENCY

Description of the Scale of Self-Sufficiency.—Bernreuter postulated from his own observation and experimentation the trait of "self-sufficiency" which is represented by Scale B2-S of the Bernreuter Personality Inventory.

"Apparently there are great individual differences in the extent to which various persons are dependent upon others in the ordinary affairs of life. Some individuals frequently need advice, some often need to receive expressions of sympathy, encouragement, or appreciation; others rarely require such forms of stimulation. Again some persons are unhappy when they are by themselves, others prefer to be alone. In a word, people differ in the extent to which they are 'self-sufficient.'"[15]

According to the manner in which the scale is weighted the individual

[12] R. G. Bernreuter, *loc. cit.*

[13] L. L. and T. G. Thurstone, "A Neurotic Inventory," *Journal of Social Psychology*, I (February, 1930), pp. 12–13.

[14] R. G. Bernreuter, *Manual for Personality Inventory*, Stanford University Press, 1931.

[15] R. G. Bernreuter, *ibid.*

who makes a high score on the scale is designated a "self-sufficient" person. The description of the individual as based upon the questions which are most heavily weighted for this scale is as follows:

"*High B2-S.*—The individual who scores high on the B2-S scale is able to be contented when by himself. He prefers to work alone and depends upon his own judgment in reaching decisions and formulating plans.

"*Low B2-S.*—The individual who scores low is dependent upon others for enjoyment. He likes to be with other people a great deal, and prefers company both while working and during leisure hours. He prefers to talk problems over with others and to receive advice before reaching decisions."[16]

B3-I. THE MEASURE OF INTROVERSION-EXTROVERSION

Development of the Concept of Introversion and Extroversion.—The classification of individuals into types which are comparable to those described by the currently used terms, introversion and extroversion, was early conceived of by psychologists. It is difficult to discover just what particular psychologist should be given credit for the original dichotomy of individuals on this or other closely allied bases. However, it is to Jung that one can probably credit the present-day interest in the differentiation of individuals as to introverted or extroverted types. Jung seems to have been the first to postulate these types upon the basis of the "flow of the libido."[17] Even he, however, drew heavily from the work and theories of Gross, Freud, and Adler. To Jung introversion and extroversion were mental mechanisms for the liberation of the "libido," or the psychic energy of the individual. He held that all psychological phenomena could be considered as a manifestation of energy. According to Jung, when the direction of the flow of the libido is outward toward an object the individual is extroverted; and when the flow of the libido is directed inward, towards himself, he is introverted. With the extrovert the subject contains the unconditioned value and determines to a large extent the subject's reactions. The introvert's unconditioned value is in himself.

Description of the Scale of Introversion-Extroversion.—Jung determined whether the individuals whom he studied were typically introverted or typically extroverted by asking each individual direct questions about his characteristics. If one describes the individual according to his reactions to the questions of the Bernreuter Personality Inventory as measured by the B3-I scale, the description is as follows:

"*High B3-I.*—The individual who scores high on this scale tends to be introverted; that is, he is imaginative and tends to live within himself. He is introverted in the sense that he is introspective and given to autistic thinking. The high score shows the symptoms of a neurotic condition which are typical of those individuals who score high on the B1-N scale.

[16] R. G. Bernreuter, *loc. cit.*

[17] C. G. Jung, *Collected Papers on Analytical Psychology*, p. 288. Tr. by C. Long, London, 1916.

"*Low B3-I.*—The individual who scores low is extroverted in the sense that he rarely substitutes day-dreaming for action. He rarely worries and seldom suffers emotional upsets. He is emotionally stable and possesses the characteristics of the individual who scores low on the B1-N scale."[18]

B4-D. THE MEASURE OF DOMINANCE-SUBMISSION

History and Development of the Concept of Dominance-Submission.—From observations of human behavior in a social group psychologists were intrigued to discover why certain individuals seemed to stand out from the rest of the group and often to dominate it. The attitudes of dominance and submission are today commonly considered as definite traits of personality which have their origin in the social environment. This concept has, like the other concepts considered in relation to the Bernreuter Personality Inventory, borne other names. Some psychologists use the term, dominance, synonomously with "self-assurance," sometimes with "aggressiveness," "force," "initiative," "assurance," and "ascendance." G. W. and F. H. Allport have made probably the most noteworthy contribution of recent years to this concept. They have defined their concept of dominance-submission in the following manner:

"If two persons of equal status come into a face-to-face relation, and if the behavior of each is a response solely to the immediate overt behavior of the other, there generally results a conflict, genuine, though unconscious. The reaction of each is centered in the drives of his own personality. Even where there is agreement as to the ends desired from the interview, there will be some cause for friction as to the choice of means. Social behavior is not a smooth running machine, but a succession of conflicts and readjustments between individuals. Each one, therefore, strives to carry his point in the encounter. In the sequel there stands revealed one of the fundamental traits of personality. One is likely to become the master; his impulse dominates. The other yields and adjusts his behavior to the control of the first. The former personality we may call ascendant—the latter, submissive."[19]

The Allports conceive of this characteristic behavior of the individual as involving two traits, ascendance and submission, each of which requires an active set of adjustments in the individual. Both tendencies may be found in a single individual but his personality is characterized by the excess of one of these traits above the other, i.e. the ascendant over the submissive, or vice versa.

Description of the Scale of Dominance-Submission.—The dominance-submission scale of the Bernreuter Personality Inventory is developed directly from the scale prepared by the Allports for the measurement of these traits.[20] Again the characteristic responses of the individual are evaluated in terms of a scale and the resultant description of the individual is as follows:

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[18] R. G. Bernreuter, *op. cit.*

[19] G. W. and F. H. Allport, *Social Psychology*, p. 119. Boston: Houghton Mifflin Co., 1924.

[20] G. W. Allport, "A Test for Ascendance-Submission," *Journal of Abnormal and Social Psychology*, XXIII (1928), pp. 118–136.

"*High B4-D.*—The individual who scores high on this scale is dominant in face-to-face situations with his equals. He is self-confident and aggressive, and readily assumes a position in the foreground at social functions. He converses readily and suffers no feelings of inferiority while doing so.

"*Low B4-D.*—The individual who scores low is submissive in face-to-face situations with his equals. He lacks self-confidence, keeps in the background at social functions, and rarely takes the initiative in the direction of people and activities. He experiences feelings of inferiority and is reluctant to meet important personages."[21]

SUMMARY OF FINDINGS

With regard to the application of the Bernreuter Personality Inventory to the teachers of physical education who cooperated in the present study, the following general summary may be made.

B1-N, A Measure of Neurotic Tendency.—The scores made by the most successful group and the less successful group of teachers of physical education tend to approach opposite ends of the scale. The scores made by the most successful teachers indicate that they possess greater emotional stability than the less successful teachers. The mean of the scores of the most successful group is —101.6 while the mean for the less successful group is —14.0. The reliability of the difference between these means is 6.82σ which indicates that, considered statistically, this is a significant group difference. When compared with the scores made by an average group of women the less successful teachers show only slightly more tendencies toward a neurotic condition than does the average group. The emphasis, therefore, does not need to be placed upon the neurotic tendencies or the emotional maladjustment of the less successful teachers, but rather, the emphasis should be placed upon the significant emotional stability of the most successful teachers.

B2-S, A Measure of Self-Sufficiency.—On this scale there is a greater overlapping of scores between the two groups of teachers than for any of the scales. Consequently, the differences between the two groups of teachers is less marked than for the other scales of the Inventory. However, there seems to be a high degree of probability that the most successful teacher is more self-sufficient than the less successful. The mean score for the most successful group is 22.8 and for the less successful group it is —6.0. It may be possible that the weighting or score values of this particular scale need to be more thoroughly refined. Intellectual self-sufficiency and social self-sufficiency should perhaps be considered on separate scales.

B3-I, A Measure of Introversion-Extroversion.—The scores of the most successful teachers of physical education place them rather definitely in the classification of extroverted-type individuals, whereas the less successful teachers possess reactions which are characteristic of introversion. Only three of the fifty most successful teachers made scores

[21] R. G. Bernreuter, *op. cit.*

above zero, i.e., scores on the introverted end of the scale. However, such a statement must not be accepted as too conclusive evidence since seventeen of the fifty less successful teachers obtained scores below zero, i.e., scores on the extroverted end of the scale. The less successful teachers appear to be only slightly more introverted than an average group of adult women, but the most successful teachers are decidedly more extroverted than the average adult women.

B4-D, A Measure of Dominance-Submission.—The group of most successful teachers are more dominant in their reactions than the less successful teachers. It may be said of the less successful teachers that they are characterized not so much by an extreme degree of submissiveness as by the lack of dominant qualities. The significance of the difference between the means of 74.4 for the most successful and 14.6 for the less successful group of teachers indicates that the B4-D scale distinguishes between the two groups to a reliable degree.

Application of Results.—The results of applying the Bernreuter Personality Inventory to the teachers of physical education who cooperated in the present study are somewhat startling. One who is by nature skeptical regarding the use of the psychological questionnaire may find that the overlapping of scores between the two groups amply justifies his attitude. On the other hand, the significance of the findings for differentiating between the two groups of teachers cannot but raise the hopes of directors and teachers who are seeking some aid in the guidance of the prospective teacher of physical education.

CHAPTER V

SUMMARY OF CONCLUSIONS AND IMPLICATIONS FOR GUIDANCE

The problem of this study was stated in Chapter I in a series of questions. Since the scores made on the Bernreuter Personality Inventory furnish the most significant answers to certain of these questions they have been reported in detail in this article. From the three other blanks used in this study certain other conclusions have been derived. These conclusions, together with those evolved from the application of the Bernreuter Personality Inventory, are presented in summary form in the following statements:

1. No close relationship is found between success in teaching physical education and participation and performance in physical education activities in the secondary school. There is no significant difference between the number or the types of physical education activities participated in during secondary school by the most successful and the less successful teachers.

2. There are significant differences between the two groups of teachers as regards both the number and importance of positions of leadership

held in the secondary school. The most successful teachers held a greater number of positions of leadership in the secondary school and more often held the more important of such positions.

3. The possession of an early interest in the teaching of physical education does not bear any significant degree of relationship to success in teaching physical education.

4. An early decision to become a teacher of physical education is not an index of success in teaching physical education.

5. The Bernreuter Personality Inventory reveals significant differences between the two groups of teachers of physical education. The means for the two groups show reliable differences on the B_1-N, the B_3-I, and the B_4-D Scales, with a high probability of a reliable difference on the B_2-S Scale.

a. As a group the most successful teachers have greater emotional stability than the less successful teachers.

b. The most successful teachers are probably more self-sufficient than the less successful teachers although there is more overlapping between the scores on the B_2-S Scale than for any of the other scales.

c. The group of most successful teachers are to a significant degree more extroverted than the less successful teachers.

d. Dominance appears to be a characteristic of the group of most successful teachers.

6. The Morris Trait Index L Test as it is set up and scored at the present time does not distinguish between the two groups of teachers of physical education to any reliable extent. Sections IV and V indicate that they offer possibilities for discrimination.

7. The Interest Blank as a whole does not reveal significant differences between the two groups of teachers of physical education. Certain of its items indicate some ability to differentiate between the two groups.

Limitations of the Present Study.—Only a few of the many important qualities of teachers of physical education have been investigated in the present study. The arbitrary concentration upon qualities which could be investigated through the use of questionnaires has narrowed the confines of the study.

The psychological questionnaire has inherent limitations. Rapport between the examiner and the subject is of utmost importance. In the present study where reactions to the questions were obtained by mail it is impossible to judge the attitudes and possibly biased responses of the subjects.

The number of cases studied in this investigation is too small. The statistical significance of more findings could have been established if the two groups of teachers had been larger. The use of the technique of matching the teachers eliminated many whose reactions might have been of value. However, since the value of the inferences drawn must be in

proportion to the comparability of the groups, the operation of this criterion should help to counteract the influence of the limitation of the size of the groups.

The method used in the present study for the selection and the classification of the teachers of physical education is open to criticism. The criteria of teaching success which have formed the bases for selection and classification are those held by faculties and public and private school administrators. Thus, the present study is developed from no common understanding of what constitutes teaching success in physical education. It has seemed impossible to avoid this situation in a study of this nature as it involves the whole controversial question of the aims and the place of physical education in the educational program.

The available knowledge regarding the fluctuation and change of attitudes, feeling-reactions, and interests of the human being makes one very cautious in the use of any measures of these variables. On the other hand, the measures of the larger interest centers and reactions of the human being give evidence of a certain consistency within the individual. The present study is limited to the reactions of fifty pairs of matched teachers of physical education made only at one period of their lives and one can only surmise their reactions during earlier periods of their experience. Therefore, in the application of any findings of the present study caution is imperative.

Implication for Guidance.—From the results of the present study implications for the guidance of the prospective teacher of physical education may be drawn. These may be stated as follows:

1. The teacher-training faculty needs to emphasize the fact to the prospective teacher that although ability and participation and enjoyment of physical education activities in the high school may lay the foundation for success in teaching physical education other qualities seem to be equally important. Both the most successful and the less successful teachers of physical education studied possessed in common a liking for activities such as baseball, basketball, swimming, tennis, and track while they were in high school.

2. An early interest in teaching physical education or an early decision to become a teacher of physical education is no *a priori* guarantee of success in teaching physical education. Prospective teachers often present their long interest in the teaching of physical education as a factor of major consideration for estimating their ability to teach physical education. The factors which have narrowed the vocational interests of the applicant should be investigated and emotional factors considered. Breadth of interests may be a better criterion of success than an early specific interest.

3. The Bernreuter Personality Inventory gives promise of potential value for the guidance of the prospective teacher of physical education.

The findings of the present study imply that it is not sufficient to compare the raw test scores of the prospective teacher of physical education with the norms derived by Bernreuter for college women or high school girls. (This sheet of percentile norms is sent by Stanford University Press to those who use the inventory.) A translation into percentile rank on these scales would be based upon the hypothesis that the teacher of physical education needs to fit into a "normal" population. The present study shows that the distribution of the scores made by the less successful teachers lies rather close to the normal percentile distribution for adult women. On the other hand, the distribution of scores of the most successful teachers is much closer to the preferred ends of all four scales. The most successful teachers make responses to the questions of the Bernreuter Personality Inventory which indicate that they are as a group more emotionally stable, more self-sufficient, more extroverted, and more dominant than the "normal group" of adult women and the less successful teachers of physical education. Therefore, in order to improve guidance procedures when using the Bernreuter Personality Inventory, the scores of the prospective teacher need to be compared with a percentile scale of the type evolved in the present study from the scores of the most successful teachers of physical education.

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A Study of the Interests of The Pennsylvania State College Freshmen in Certain Formal and Natural Physical Activities

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THE WHOLE question of the interests and needs of students has been an educational problem for a good many years.* During this time, it has been approached from many points of view by educators and psychologists. Judging from a recent paper read before the Department of Superintendence of the National Education Association by Professor Frank N. Freeman of Chicago, there still is much to be accomplished before a satisfactory answer is forthcoming.

Closely related to interests and needs is the problem of arriving at some temporary yet satisfying solution to the question of the relative merits of the Formal and Informal methods of teaching, and Formal and Natural content in physical education. In certain centers of learning, these problems are said to have long been solved. Occasionally, however, one finds himself in an institution, or in an entire commonwealth, wherein the issues are just beginning to manifest themselves and are very much alive.

Although it may be heresy to say so before a group of researchers, one of the reasons why *these* problems are difficult to solve in physical education is probably because we who carry on researches find it difficult if not impossible to leave behind our honest and well-intended biases, prejudices, and convictions.

The physical educator often finds it challenging to be affiliated with a department in which his convictions regarding students' interests, the Natural and Formal programs, and related problems are questioned. In attempting to arrive at the *truth* regarding such problems, in a given department, it sometimes is desirable to enlist the aid of some of his colleagues whose beliefs (and hopes!) are abruptly divergent to his own.

The present study of the male freshman classes entering The Pennsylvania State College in 1931 and 1932 includes a total of about

* A paper presented at the Research Section Meeting, Annual Convention of the American Physical Education Association, April, 1933.

2400 young men. According to a rather careful check upon the backgrounds of the members of these two classes, it was found, that for the most part, they came from the same localities and had been exposed to very similar programs of physical education. A study of their physical education backgrounds reveals the fact that the large majority of these students were exposed to required physical education programs which offered instruction only in formal activities, formally taught.

As one aspect of the study, the 1200 freshmen who entered the college in 1931 were given two semesters of activities taken from both the Formal and Natural programs. These activities were taught by a staff, most of whom were trained in institutions offering professional training in physical education which was largely formal in character.

In the first semester of this present college year, the freshmen of 1932 were given a program of required physical education which was largely Natural in content and Informal in method. Half of the staff at this time had received training, as previously described. The other half were men whose undergraduate work had been largely formal in character. Their graduate work, however, was carried on in an institution offering courses which gave an understanding of and a background in the Natural program. This report does not include the reactions of the freshmen of 1932 to the program which is being carried on during this present semester.

In this report of the findings of the study to date, an attempt will be made to answer the following four questions:

1. What were the activity interests of the college freshmen of 1931 (whose high school physical education backgrounds were formal in character) after two semesters of a college physical education program, half of the time being devoted to formal activities and half of the time being devoted to natural activities?

2. What were the activity interests of the college freshmen of 1932 (with physical education backgrounds similar to the 1931 freshmen) after one semester of a physical education program, 90 per cent of the time being devoted to natural activities and 10 per cent to formal activities?

3. How do these student interests in activities compare with the activities recommeded for college men by the Committee on Curriculum Research* in 1930?

4. How do these student interests compare with the activities in which mature men participate most?

AT THE close of their first year in college, the 1931 freshmen were asked several questions relative to their reactions to the types of physical education programs offered to them at The Pennsylvania State

* College Physical Education Association.

College. Students were told to answer the questions so that the department would know precisely their personal reactions.

The first question was: In what one activity, in which you have received instruction this year, do you most enjoy participating? There were seventeen activities offered during the year. Table I presents the first ten activities in their rank order, according to the per cent selecting the activity. The calisthenics, heavy apparatus, and marching ranked fifteenth, sixteenth, and seventeenth respectively. The other four activities of low ranking were clog dancing, cross-country, track, and horseshoes.

The second question was: In what three other sports offered during the year do you like to participate next best? Table II presents the first ten of seventeen activities in their rank order. The activities occupying fifteenth, sixteenth, and seventeenth places are heavy apparatus, marching and calisthenics, respectively.

TABLE I

PER CENT OF THE 1200 FRESHMEN OF 1931 EXPRESSING FIRST CHOICES OF ACTIVITIES OFFERED AT THE PENNSYLANIA STATE COLLEGE

Rank	Activities	Per Cent Selecting
1	Basketball	22
2	Baseball (Playground)	14
3	Football (Touch)	14
4	Tennis	12
5	Volleyball	10
6	Boxing	5
7	Golf	4
8	Handball	3
9	Wrestling	3
10	Soccer	2

TABLE II

PER CENT OF THE 1200 FRESHMEN AT THE PENNSYLVANIA STATE COLLEGE IN 1931 EXPRESSING PREFERENCE FOR THE THREE ACTIVITIES, LIKE "NEXT BEST," AFTER THEIR FIRST CHOICES AS SHOWN IN TABLE I

Rank	Activities	Per Cent Selecting
1	Basketball	20
2	Baseball (Playground)	16
3	Tennis	10
4	Football (Touch)	10
5	Boxing	8
6	Volleyball	7
7	Handball	6
8	Golf	5
9	Wrestling	4
10	Soccer	3

The students were then asked: "What physical activities, in which you have been instructed this year, do you actually dislike?" Table III presents the first ten of the seventeen activities. Tennis, football, and soccer were ranked fifteenth, sixteenth, and seventeenth respectively.

The fourth question asked of students was: "In what activities, in which you have some instruction this year, would you desire *additional* instruction?" Table IV presents the first ten activities mentioned in rank order. Calisthenics, heavy apparatus, and horseshoes were ranked last, in that order.

TABLE III

PER CENT OF THE 1200 FRESHMEN OF 1931 EXPRESSING DISLIKE FOR VARIOUS ACTIVITIES OFFERED AT THE PENNSYLVANIA STATE COLLEGE

Rank	Activities	Per Cent Disliking
1	Heavy Apparatus	32
2	Calisthenics	26
3	Marching	24
4	Fencing	3
5	Horseshoes	3
6	Cross-country	1
7	Boxing	1
8	Squash	1
9	Wrestling	1
10	Volleyball	1

TABLE IV

PER CENT OF THE 1200 FRESHMEN WHO WERE GIVEN SOME INSTRUCTION IN CERTAIN ACTIVITIES AT THE PENNSYLVANIA STATE COLLEGE AND WHO DESIRED ADDITIONAL INSTRUCTION IN THESE ACTIVITIES

Rank	Activities	Per Cent Preferring More Instruction
1	Boxing	20
2	Basketball	15
3	Handball	13
4	Wrestling	12
5	Baseball (Playground)	10
6	Tennis	8
7	Football (Touch)	6
8	Volleyball	4
9	Golf	3
10	Soccer	3

Table V presents the ranked activities in response to the question: "In what activities, in which you have received some instruction this year, do you desire no further instruction?"

The freshmen were then asked to mention those activities in which they had received no instruction at The Pennsylvania State College but in which they would like to receive instruction. Table VI presents the

ranked order of the five activities mentioned most frequently by the students, in answer to this question.

TABLE V

PER CENT OF THE 1200 FRESHMEN IN 1931 WHO WERE GIVEN SOME INSTRUCTION IN CERTAIN ACTIVITIES AT THE PENNSYLVANIA STATE COLLEGE DESIRING NO FURTHER INSTRUCTION IN THESE ACTIVITIES

Rank	Activities	Per Cent Caring for No Further Instruction
1	Heavy Apparatus	22
2	Calisthenics	18
3	Horseshoes	14
4	Marching	14
5	Boxing	5
6	Wrestling	5
7	Handball	4
8	Volleyball	4
9	Basketball	3
10	Football	2

TABLE VI

PER CENT OF THE 1200 PENNSYLVANIA STATE COLLEGE FRESHMEN IN 1931 WHO HAD NO INSTRUCTION IN CERTAIN ACTIVITIES BUT WHO DESIRED INSTRUCTION IN THEM

Rank	Activities	Per Cent Preferring Instruction
1	Swimming	34
2	Baseball	22
3	Lacrosse	16
4	Fencing	12
5	Squash	8

An effort was made to secure student reaction to the methods of teaching used during the year. Only 17 students out of 1200 expressed a preference for the plan whereby a given class was taught at one time by one instructor using the response-to-command method. One thousand, one hundred and four students preferred the plan whereby a class was broken up into squads of 10 or 12 men and taught by instructors or by students majoring in physical education, using informal methods of instruction.

As a final check on the students' reactions to program content, they were asked whether they preferred a physical education program consisting of gymnastics, calisthenics, heavy apparatus, and marching, or a program of games and sports, or a program consisting of both types of activity. Three-hundredths of one per cent of the 1200 students preferred the formal program, 91 per cent preferred the games and sports

program, the remainder expressed a preference for a program consisting of both types of activity.

ALTHOUGH these data seemed to indicate certain implications, some of the staff members wondered whether or not the freshman class of 1931 was representative of the classes entering The Pennsylvania State College year after year. Consequently it was decided to conduct the study for at least another year.

It was found from the work done in 1931 that, if students ranked all the activities in order of their preferences, sufficient data pertinent to a study of their interests could be secured. Consequently, the freshmen in 1932 were asked only to rank the fourteen activities offered, in order of their preferences. Mr. Nelson S. Walke, in charge of required physical education in 1932, collected the data for the 1932 freshmen. Table VII shows the first ten activities, ranked as in previous tables, which were selected as first choices by the 1932 freshmen. No student selected calisthenics for first choice. Twelve students selected heavy apparatus for their first choice. Track and speedball ranked 11th and 12th. Tables I and VII contain comparable data.

TABLE VII

PER CENT OF 1200 FRESHMEN IN 1932 WHO SELECTED A GIVEN ACTIVITY, OFFERED AT THE PENNSYLVANIA STATE COLLEGE, AS THEIR FIRST CHOICE

Rank	Activities	Per Cent Selecting Activity as First Choice
1	Basketball	20
2	Tennis	19
3	Football (Touch)	16
4	Baseball (Playground)	10
5	Wrestling	9
6	Volleyball	6
7	Soccer	5
8	Handball	4
9	Golf	3
10	Boxing	3

The activities which were given second, third, or fourth places by the freshmen of 1932 are grouped together and ranked in Table VIII. Heavy apparatus and calisthenics again ranked in the last two places. Track and speedball again ranked eleventh and twelfth. The data in Tables II and VIII are comparable.

Judging from the data presented in Tables I, II, VII, and VIII, the ten activities which received most frequent mention as choices and preferences are the same for both groups of freshmen although the rank order varies somewhat. These results were somewhat surprising to

many staff members in this particular physical education department because the large majority of these students were more familiar with physical education activities which were formal in character. Likewise, it was surprising to find that the freshmen in 1931 preferred the informal method of instruction since most of them had been taught physical education by formal methods throughout their high school years. Other things being equal, it seemed reasonable to expect these students to indicate a preference for the type of program with which they were most familiar and in which they had been educated.

TABLE VIII

PER CENT OF 1200 FRESHMEN IN 1932 AT THE PENNSYLVANIA STATE COLLEGE WHO SELECTED CERTAIN ACTIVITIES AS THEIR SECOND, THIRD, OR FOURTH CHOICES

Rank	Activities	Per Cent Selecting Activity As Second, Third, or Fourth Choices
1	Volleyball	22
2	Soccer	18
3	Handball	12
4	Wrestling	10
5	Football (Touch)	8
6	Tennis	7
7	Baseball (Playground)	6
8	Boxing	5
9	Basketball	4
10	Golf	4

THE third phase of this report deals with a comparison of the activity interest of these two groups of freshmen with the findings of the college division of the Committee on Curriculum Research.* It will be recalled that the committee received evaluations from forty experts, composed chiefly of college directors of physical education, on thirty different physical education activities. The evaluations of these activities were based upon their contributions to the following five criteria: physical, social and moral, psychological, safety, and recreation. The ranking according to the "all-round contribution" of the first fifteen activities is reproduced in Table IX. It will be seen that in the first ten activities, five of them also are found in the lists of ten activities in which the two groups of freshmen enjoyed participating.

In comparing the list of fifteen activities in Table IX with the list of the first ten activities selected by the 1931 and 1932 freshman groups, it is found that nine activities are common to both lists. If squash and

* "Report of the Committee on Curriculum Research," RESEARCH QUARTERLY OF THE A.P.E.A., I; 2. (May, 1930).

the aquatic activities (swimming, diving, life-saving, and water-polo) found in Table IX are eliminated (since the freshmen had received no instruction in these activities and consequently could not select them), we find that nine of the remaining twelve activities are the same as those listed as first choices by the two groups of freshmen. It also will be noted that swimming, baseball, and squash, the three remaining activities in the first ten of the "Research Committee's" list in Table IX, are the same as three of the five activities in Table VI, in which the freshmen had received no instruction but in which they desired instruction.

TABLE IX

FIFTEEN OF THE THIRTY ACTIVITIES SELECTED BY THE COMMITTEE ON CURRICULUM RESEARCH* RANKED IN ORDER OF "ALL-ROUND CONTRIBUTION" TO COLLEGE MEN

Rank	Activities Ranked According to All-Round Contribution	Rank	Activities Ranked According to All-Round Contribution
1	Swimming and Diving	9	Speedball
2	Tennis	10	Playground Ball
3	Football (Touch)	11	Golf
4	Basketball	12	Boxing
5	Squash and Squash Tennis	13	Handball
6	Soccer	14	Water-Polo
7	Baseball	15	Volleyball
8	Life-Saving		

It therefore appears that the primary activity *interests* of these freshmen, and the activities selected to fill their physical education *needs,* represent close parallels. This might seem rather significant to the curriculum-builder who often finds interests and needs in divergent positions. It also appears that if the physical education program of these freshmen is to contribute in an all-round manner, in addition to activities now offered, certain other activities should be included in the program in this particular college.

THE fourth aspect of this report deals with adult interests in physical activities. In 1927, Scott† reports a study made of activity interests of 990 business and professional men. Of the 46 activities mentioned, the first 20 are ranked in order of frequency in Table X. Four of the first 10, and 6 of the first 20 activities in this list of Scott's occur also in the freshman list.

Two of the first ten and six of the first twenty activities in Scott's list occur also in the "Research Committee's" list, in Table IX. Outstanding among the activities in which the business and professional men

* College Physical Education Association.

† H. H. Scott, "Physical Recreation and Exercise For Business Men." *The Nation's Health,* IX: 6. (June, 1927).

participate, and of which no mention is made by the Research Committee, are: fishing, hiking, gardening, and hunting.

In 1932, McAndrews* conducted a study of about three hundred college professors at The Pennsylvania State College, relative to their participation in physical activities. A total of forty-two different activi-

TABLE X

THE FIRST 20 OF 46 ACTIVITIES MENTIONED BY 990 BUSINESS AND PROFESSIONAL MEN IN SELECTING THE ACTIVITY IN WHICH THEY NOW PARTICIPATE MOST

Rank	Activity	Rank	Activity
1	Swimming	11	Boating
2	Fishing	12	Equitation
3	Golf	13.5	Skating
4	Hiking	13.5	Apparatus
5	Gardening	15.5	Baseball
6	Hunting	15.5	Boxing
7	Calisthenics	17	Bag Punching
8	Tennis	18.5	Basketball
9	Handball	18.5	Squash
10	Volleyball	20	Woodcutting

ties were mentioned. The first twenty are ranked in order of frequency in Table XI. It will be found that only two of the first ten and five of the first twenty activities in McAndrews' list correspond to the *first* ten activities selected by the freshmen. Three of the first ten, and seven of the first twenty activities in McAndrews' list occur also in the "Research Committee's" list.

TABLE XI

THE FIRST 20 OF 42 ACTIVITIES MENTIONED BY 300 COLLEGE PROFESSORS AT THE PENNSYLVANIA STATE COLLEGE IN SELECTING THE ACTIVITY IN WHICH THEY NOW PARTICIPATE MOST

Rank	Activity	Rank	Activity
1	Hiking	11	Skating
2	Gardening	12	Boating
3.5	Social Dancing	13	Handball
3.5	Swimming	14	Volleyball
5	Golf	15	Equitation
6	Fishing	16	Calisthenics
7	Tennis	17.5	Baseball
8	Hunting	17.5	Tobogganing
9	Horseshoes	19	Basketball
10	Bowling	20	Skiing

Comparing the twenty activities selected by business and professional men with the twenty selected by the college professors, it is found that *fifteen* of them are the same. Outstanding among the activities mentioned by business and professional men and college professors, and found

* M. S. McAndrews, The College Professor and Physical Education. (Not published.)

neither in the freshman nor the "Research Committee's" lists are: hiking gardening, fishing, hunting, boating, skating, and equitation.

THIS study of the activity interests of The Pennsylvania State College freshmen offers certain implications for the School of Physical Education and Athletics in that institution, in spite of the many weaknesses and limitations in the study.

The implications which seem to be justified are:

1. That there seems to be little relationship between the formalized type of high school physical education programs to which most of these two classes of freshmen had been exposed and the type of college physical education program which they enjoyed most. (This implication refers to both the program content and methods of teaching.)

2. That these two groups of freshmen enjoyed participating most in the same ten activities, but in different rank orders. (The college physical education programs and the staffs for the two classes were not the same.)

3. That the freshman class of 1931 enjoyed a games and sports program better than a program of gymnastics, heavy apparatus, marching, and calisthenics, or a program of both formal and natural content. (It will be recalled that most of the instructors at this time had received professional training from departments which emphasized the formal program of physical activities.)

4. That the activity interests of the two classes of freshmen paralleled somewhat closely the activities evaluated highest for all-round contribution by forty experts for the Committee on Curriculum Research (College Division). This relationship is more marked if those activities are omitted from the Committee's list in which the freshmen had received no instruction.

5. That the *differences* in the list of activities selected by the freshmen and the list of activities ranked highest by the college experts for "all-round contribution," suggest the need for broadening the program of physical education offered by this institution.

6. That the activity interests of these college freshmen and the list of activities selected by the Research Committee do not include several of the activities in which business and professional men (including college professors) participate most.

IT IS to be understood that these implications carry no tone of, nor claim for, finality. They merely suggest certain policies which may be made in one department for the time being.

It is also to be understood that the completed study represents one way of making one step in the selection of the content of the required physical education program, and the method of teaching it.

The procedure followed makes no claim for reliability or objectivity. Rather it is representative of a way of laying foundation material upon which certain administrative policies may be based. It may or may not be a better way of forming policies than the more common method of relying upon the judgment and experience of one individual—sometimes called the empirical method.

Lastly, this study makes no claim to be included in that category of studies which might be labeled "scientific research"—particularly in these days when the term, "research," to a good many of our number is becoming a synonymous term with "tests and measurements." The study does claim to represent an effort to arrive at the truth regarding certain physical education matters which are still rather vital issues in certain institutions and in certain localities.

Some of the Factors Determining the Attitude of Freshman Women at the University of Oregon Toward Required Physical Education

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ALMOST all departments of physical education for women in which the work is required seem to find that there are a certain number of students who take the work with a great deal of reluctance if not with actual distaste. Directors have recognized that this attitude has stood in the way of the students receiving full value from their work and have expended much thought and effort trying to better the situation.

As the work has been put on an increasingly sounder basis, educationally and scientifically, this number has been diminishing. Is it possible to lessen it still further or will there always be an "irreducible minimum" to whom systematic physical activity is distasteful? If the attitude is not inherent in the make-up of these individuals, what are the factors that are causing the unfavorable reaction? Is it due to unpleasant conditions surrounding the work—inconvenience of physical equipment, schedule difficulties, lack of time, etc.; is it because the work is required; is the work itself lacking in the quality and content and variety necessary to appeal to the girl's innate interest; or do the students come to their college work already conditioned against it? The object of this study is to find out by questioning the students themselves what their attitude really is and then to determine if possible what conditions have brought it about.

METHODS AND PROCEDURE

A questionnaire was given to 192 of the freshman women who were enrolled in the physical education service courses. In order to remove the possibility of the girls giving the acceptable reply, the questionnaires were distributed, not by the instructor, but by the senior student working on the study and the girls were requested not to sign their names.

The first part of the questionnaire had to do with the home life and the early play experiences of the individual in an effort to determine how much these experiences were affecting the present attitude toward physical education.

The second part dealt with the high school experience. This included the size of the school, the training of the physical education teachers, the activity program, etc., so that some conception of the high school background could be gained to determine if possible its effect upon the present attitude.

The third part of the questionnaire dealt with the University physical education situation in order to find out what unfavorable conditions exist here.

The responses to these were divided into two groups, those stating that they liked physical education and those stating they disliked it. The results were then tabulated, totaled, and summarized.

RESULTS AND INTERPRETATIONS

NUMBERS AND PER CENTS LIKING AND DISLIKING

Of the 192 students answering the questionnaires, it was found that 122 liked physical education in *high school* and 70, or 36.4 per cent, disliked it.

Of the 192, 171 liked physical education at the *University of Oregon* and 21, or 10.9 per cent, stated that they disliked it. These figures show that 47, or 25.5 per cent, have changed their attitude toward physical education from dislike to like since taking the service courses at the University. (Chart I.)

Of the total number liking physical education in high school (122) only two disliked it at the University. This shows therefore that likes in high school have a tendency to persist in the University as well as the dislikes.

EFFECT OF BEING AN "ONLY CHILD"

That the lack of opportunity to play with other children in childhood may have an effect upon their present attitude toward physical education is suggested by the following figures concerning those people who were "only children." Of the 70 disliking physical education in *high school,* 11, or 15.7 per cent, were only children. Of the 122 liking physical education in high school 17, or 13.9 per cent, were only children. While of the 20 who disliked physical education both in high school and at the University of Oregon 5, or 25 per cent, were only children.

EFFECT OF MUCH PLAYING ALONE

Of the 70 people who said they disliked physical education in *high school* 30, or 42.8 per cent, said that they frequently played alone; of the 122 liking physical education in high school 43, or 35.2 per cent, said they frequently played alone while of the 20 who disliked physical education both in high school and college 15, or 75 per cent, said that they frequently played alone in childhood. This may indicate that the

richness or paucity of the individual's social contacts in childhood affects her pleasure in working in the type of social groups represented by our activity classes. (Chart II.)

EFFECT OF THE ADEQUACY OF THE TRAINING OF HIGH SCHOOL INSTRUCTORS

Some interesting facts were found concerning the training of the high school physical education teachers which indicate that the training of the teachers has a direct influence upon the attitudes of students. Of the 70 people who disliked physical education in high school, 43, or 61.4 per cent, had teachers who had had no special training, while of the 122 who liked it, only 16, or 13.1 per cent, had untrained teachers. (Chart III.)

EFFECT OF RICHNESS OF HIGH SCHOOL PROGRAM

A study of the activities that the girls had had in high school was made and it was found that 45, or 64.2 per cent, of the 70 people who disliked physical education in high school had had less than 3 different activities during the 3 or 4 years there; while only 43, or 35.2 per cent, of the 122 who liked physical education in high school had had less than 3 activities. Of the 20 people who disliked physical education both in high school and at the University, 17, or 85 per cent, of them had had less than 3 different activities. These figures suggest that a physical education program in high school which offers no choice of courses whereby the individual may select activities in which she is interested or that are suited to her particular ability may have an influence not only upon her attitude while in high school but also may affect her attitude in the University.

Fifty per cent of the girls who disliked physical education at the University of Oregon had had *no* physical education in high school. (Chart IV.)

REASONS GIVEN BY STUDENTS THEMSELVES FOR A FEELING OF DISTASTE

The following are the reasons in the order of their frequency:

Formal gymnastics	21.5%
Lack of choice of activity	16.3%
Physical education not interesting	16.3%
Class came at end of the day	8.8%
Physical education teachers unattractive	7.5%
Physical education teachers uninteresting	6.3%
Not sufficient time allowed to dress	6.3%
Health	6.3%
Hate to dress and undress	3.7%
Physical education dirty	2.5%
Not able to do the work well	2.5%
Worked too hard	1.2%

The reasons given for disliking the service courses at the University of Oregon were:

Classes scheduled in afternoon	71.4%
Lack of ability to do well	9.6%
Compulsory	9.6%
Physical education not interesting	4.7%
Too tired to take activity	4.7%

EFFECT OF FORCED SELECTION DUE TO SCHEDULE DIFFICULTY

A very great effort is always made to place the students in activities in which they are interested, that are adapted to their skill and strength, and to group them with students of about the same skill level. This, however, has not always been possible. In an effort to determine what influence this has had, a question was asked to determine how many were in their courses from choice or how many because of schedule difficulty. The following results were obtained: of the 171 people who liked physical education at the University 128, or 74.9 per cent, selected the course that they were taking and 43, or 25.1 per cent, were in the course because of schedule difficulty while out of the 21 people disliking physical education at the University 14, or 66.6 per cent, were taking the courses they were in because of schedule difficulty. Lack of complete suitability of the work due to schedule difficulties would seem, therefore, to be one of the determining factors. (Chart V.)

ATTITUDES AS REFLECTED BY DESIRE TO ELECT PHYSICAL EDUCATION

At the present time only 6 terms or 2 years of physical education is required by the University of Oregon. A question was asked to determine how many would take physical education if it were not required and how many would take more than their required work if they could get credit for it. The results were: of the total (192), 128, or 77 per cent, would take physical education if it were not required and 44, or 23 per cent, would not.

If upper division credit were given, 133, or 69.2 per cent, would take more physical education and 59, or 30.8 per cent, would not. Of the 59 who said that they would not take more than the required physical education if they could get upper division credit, 36 were people who disliked physical education or all but 23 people who liked physical education would take more if they could get credit for it. (Chart VI.)

SUMMARY

The results of this study would indicate that some of the factors affecting the attitude of freshman girls at the University of Oregon toward required physical education are:

1. Lack of opportunity to play with other children in childhood.

2. The training of the physical education teachers the girls had in high school; 61.4 per cent of the pupils who disliked physical education

had untrained teachers while only 13.1 per cent of the people who liked physical education in high school had untrained teachers.

3. The richness of the high school curriculum, the type and variety in subject matter, the opportunity to select courses.

4. Inability to select the activity of their choice due to schedule.

5. Of the various subjective reasons given by the girls themselves for disliking physical education in *high school,* the following appear most frequently:

1. Formal gymnastics 21.5%
2. Lack of choice of activity 16.3%
3. Physical education not interesting 16.3%
4. Class at end of the day 8.3%

6. The most frequent subjective reasons given for disliking work at the *University of Oregon* are:

1. Schedule in late afternoon 71.4%
2. Lack of ability to do well 9.6%
3. Element of compulsion 9.6%

7. The element of requirement.

It is interesting to note that although this is still to some extent a factor, it does not affect attitudes as much as has often been contended. Only 9.6 per cent gave it as a reason for disliking it; 47 per cent of those disliking it stated they would elect it if it was not required; 77 per cent of the total number stated they would elect it if not required; 42.8 per cent of those disliking it would take more than the two years required if they could receive upper division credit; 69.2 per cent of the total would take more if they could receive upper division credit.

This study indicates that the prevalence of an attitude of distaste toward required physical education is not as great as many have thought (10.9 per cent disliking it at University of Oregon). The study does not determine whether or not there will always be an irreducible minimum to whom systematic physical activity is distasteful. But it does indicate that almost all of the factors causing this distaste in the girls coming to the University of Oregon are of a nature that can be lessened and in most cases, entirely eradicated by improved methods and organization in high school and college.

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CHART I

INCREASE IN PER CENT LIKING PHYSICAL EDUCATION IN COLLEGE OVER THE PER CENT LIKING IT IN HIGH SCHOOL

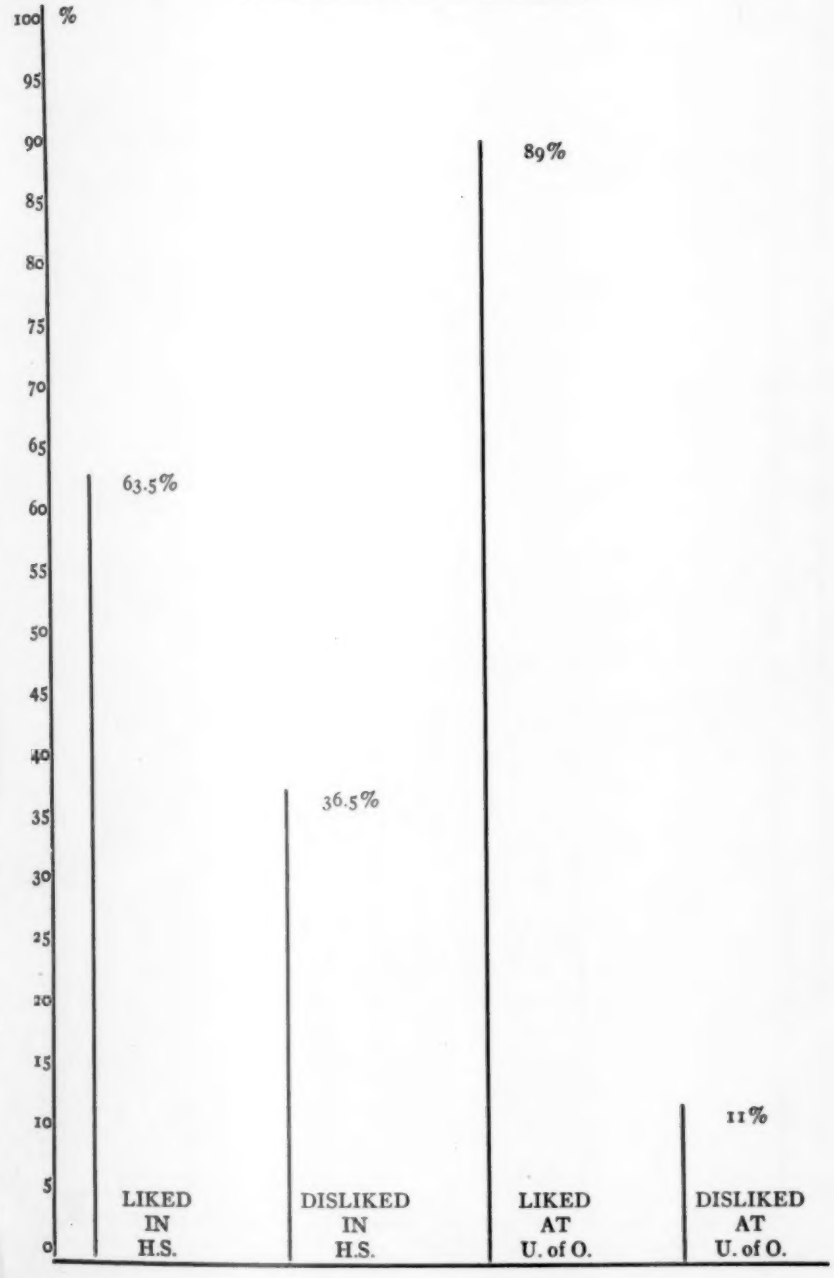
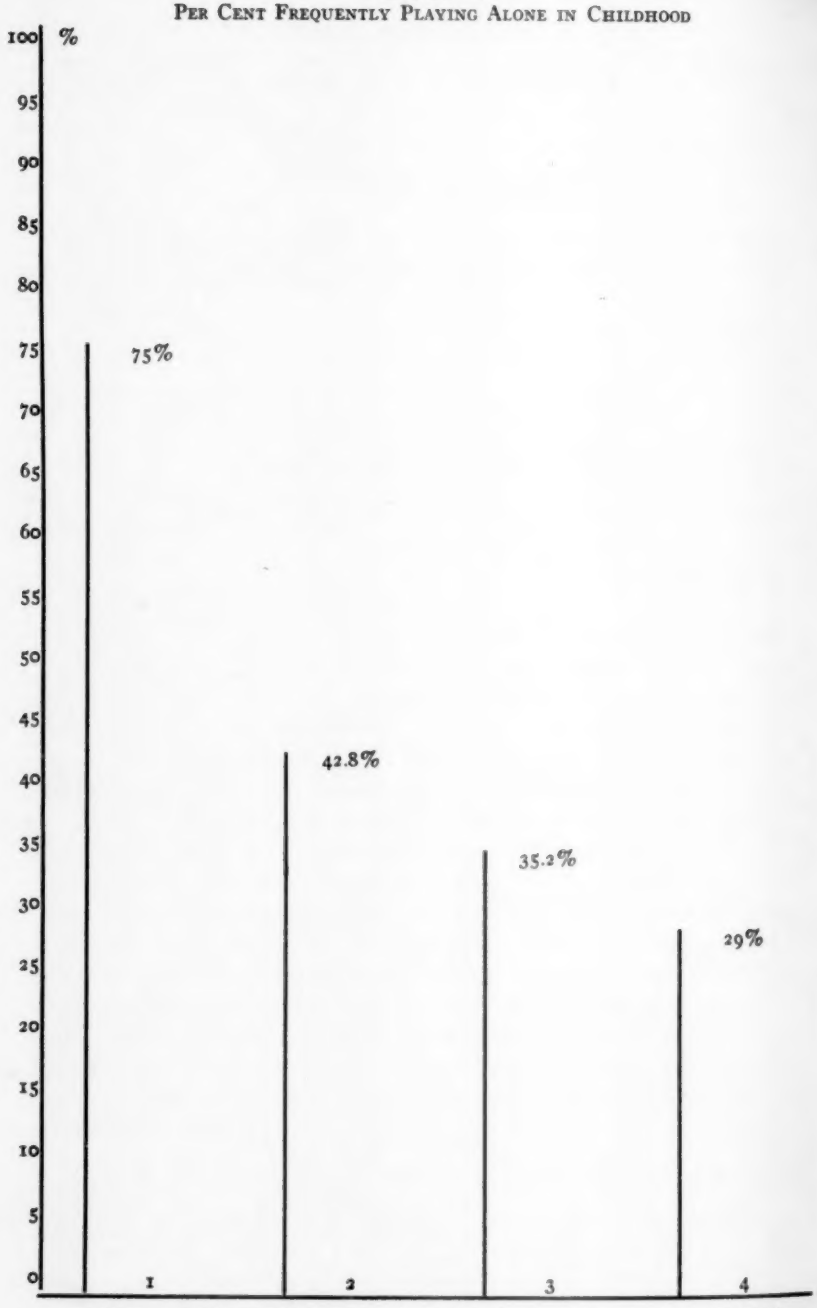


CHART II

PER CENT FREQUENTLY PLAYING ALONE IN CHILDHOOD



1. Per cent of those disliking physical education in high school and at University of Oregon who frequently played alone.

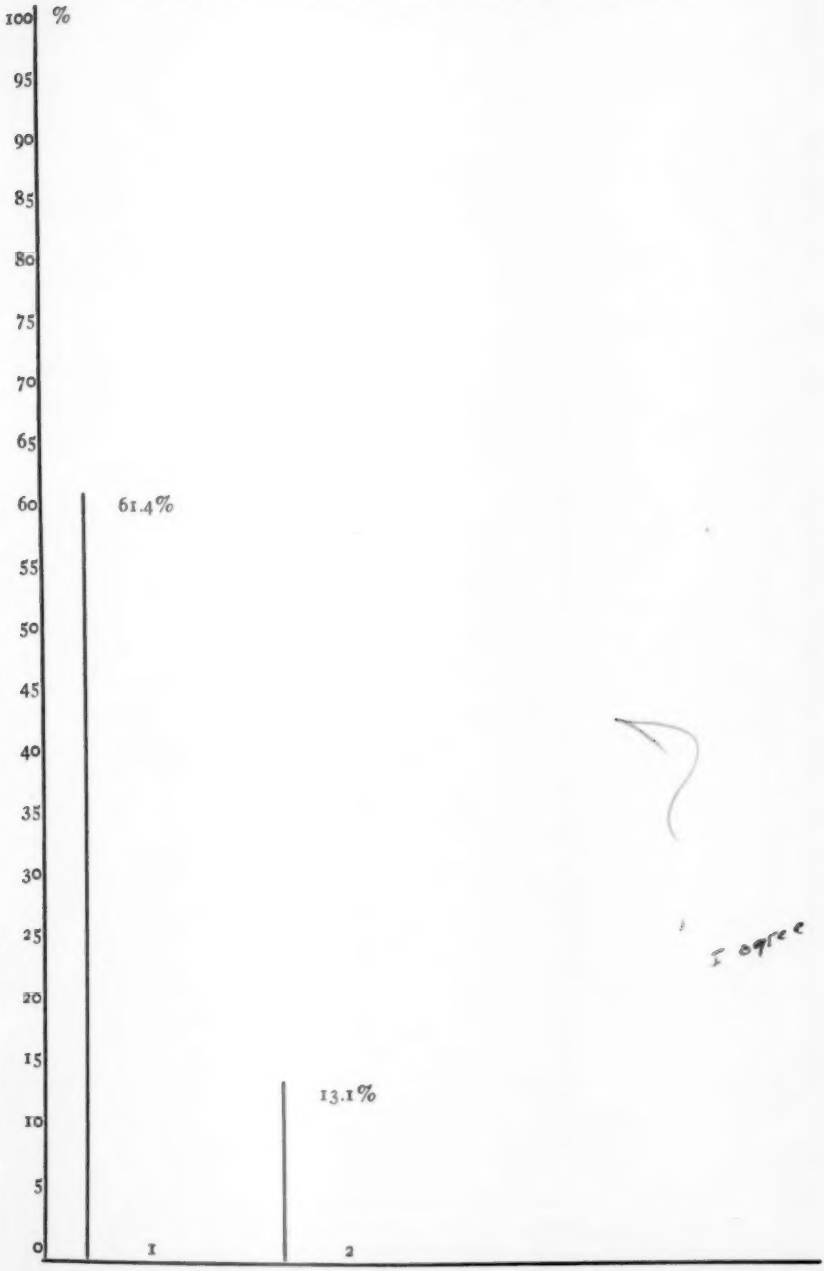
2. Per cent of those disliking physical education in high school who frequently played alone.

3. Per cent of those liking physical education in high school who frequently played alone.

4. Per cent of those liking physical education at University of Oregon who frequently played alone.

CHART III

PER CENT HAVING UNTRAINED TEACHERS IN HIGH SCHOOL

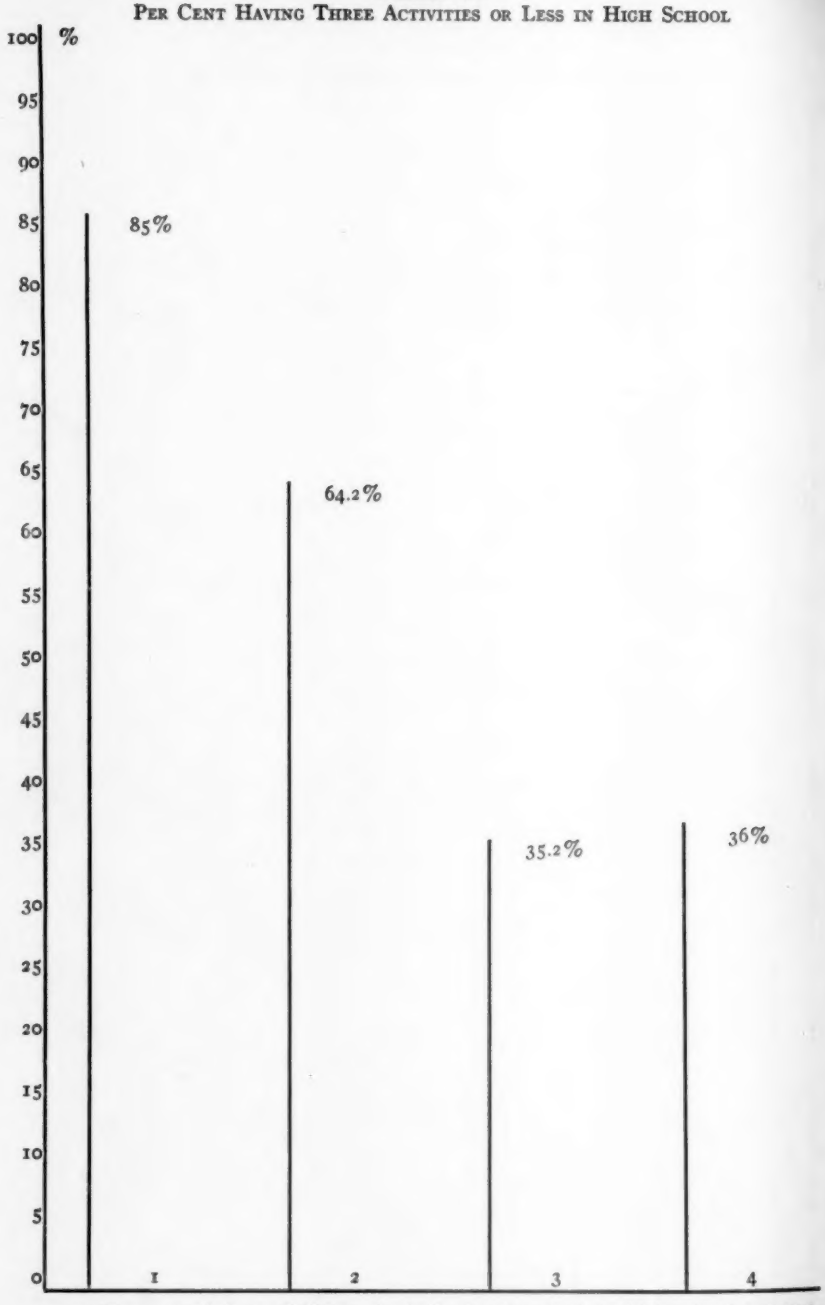


1. Per cent of those who disliked physical education in high school who had untrained teachers.

2. Per cent of those who liked physical education in high school who had untrained teachers.

CHART IV

PER CENT HAVING THREE ACTIVITIES OR LESS IN HIGH SCHOOL



1. Per cent of those disliking physical education both in high school and University of Oregon who had three activities or less in high school.

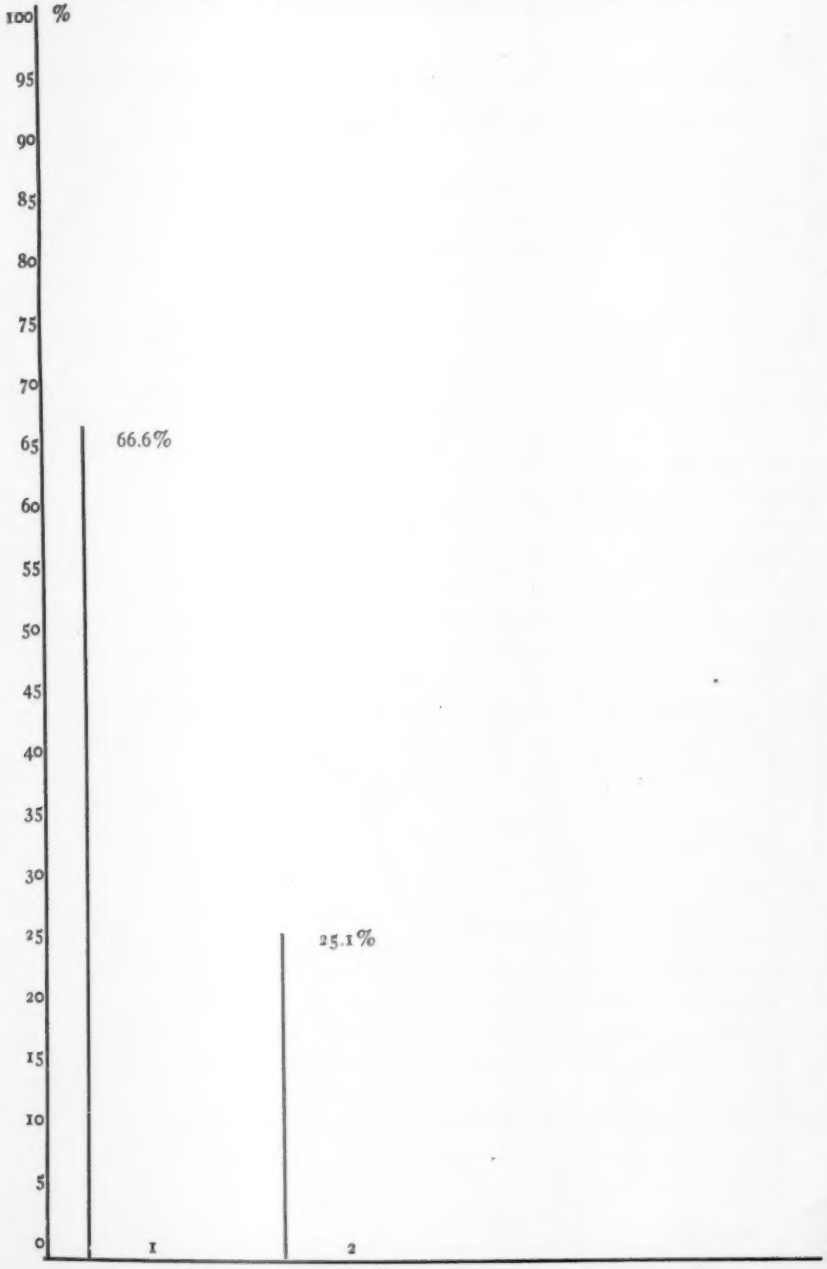
2. Per cent of those disliking physical education in high school who had three activities or less in high school.

3. Per cent of those liking physical education in high school who had three activities or less.

4. Per cent of those who like physical education at University of Oregon who had three activities or less in high school.

CHART V

PER CENT WHO ARE IN COURSES BECAUSE OF SCHEDULE DIFFICULTY

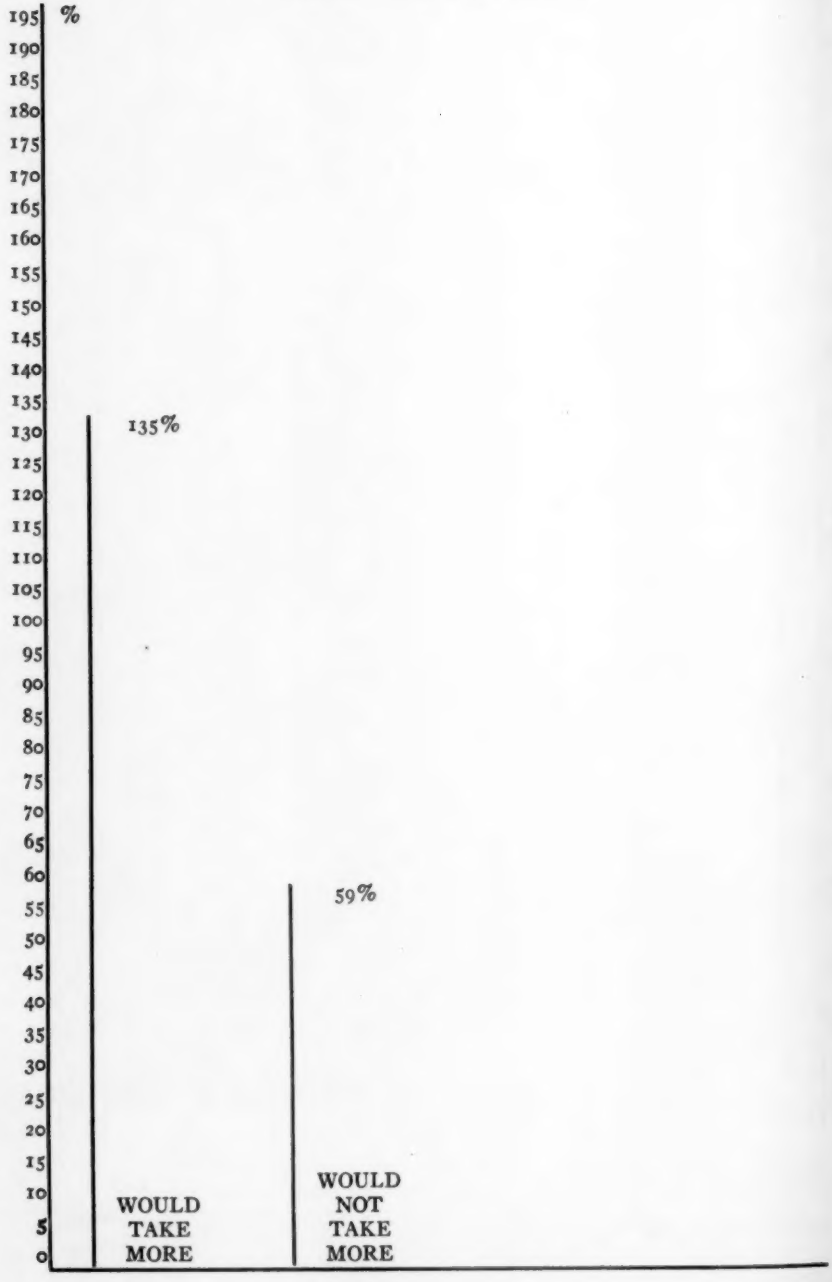


1. Per cent of those who disliked physical education at University of Oregon who were in courses because of schedule difficulty.

2. Per cent of those who liked physical education at University of Oregon who were in the courses because of schedule difficulty.

CHART VI

PER CENT WHO WOULD TAKE MORE THAN THE REQUIRED WORK IF UPPER DIVISION CREDIT WERE RECEIVED



An Experimental Study of the Effect of Fear on Muscular Coordination

By C. O. Jackson
Associate in Physical Education,
University of Illinois

AT LEAST three different methods of study have been followed in considering the emotions; viz., (1) the study of facial and other modes of expressing emotional experience, (2) the collection of descriptive or introspective reports, and (3) the investigation of the relation between the emotional experience, on the one hand, and the action of the nervous system and of the endocrine glands, on the other. In all of these methods, and in the first, in particular, it has been shown that the emotions may affect skills of various types, but how and to what extent is still an open question.

In other words, there is one method which has not been tried, namely, the method of objective measurement of the effect of an emotional experience on skill. A study which would actually measure the effect of some particular emotion on human performance would have definite value, not only because all other methods of investigation have more or less overlooked this phase of the question, but also because most of the other experiments have been definitely subjective. From the practical angle, an objective study of the emotion of fear would have definite value in the teaching of gymnastic or physical skills.

These considerations bring us to a more precise statement of our own problem.[1] It was our purpose to conduct an experimental study of the effect of fear on muscular coordination, confining the experiment to students in the gymnasium. Situations have been used which, in themselves, tend to induce fear. We have sought to investigate a method that would actually measure changes in bodily coordination as they occur during an act of skill performed under emotional conditions. The skills actually used were those developed by gymnasts in doing what is called aerial gymnastics.

It was hoped that answers to such questions as the following would stand among the results of this study; viz.,

1. What factors are responsible for the development of fear in certain athletic situations?

[1]The original study was done in the University of Illinois Laboratory for Research in Athletics under the direction of Professor Coleman R. Griffith and was accepted by the graduate school as that part of the requirement for the degree of Master of Arts in Education.

2. Under what conditions, or during what gymnastic activities is fear most likely to be present?

3. What correlation is there between a subject's mental and physical state, his performance in gymnastic activities, and his susceptibility to fear?

4. What definite procedures can be followed for overcoming fear and securing better performance in gymnastic events?

5. Will it be possible to predict from laboratory studies, the degree of skill which may be displayed in the actual performance of a gymnastic stunt when the stunt itself may be fear-exciting?

6. What differences are there, in actual movements of different parts of the body, as shown by graphs drawn from motion pictures, between skilled and unskilled performance?

Fourteen university students from the aerial gymnastic group of the Student Circus were used in the study. These subjects ranged in ability and experience from individuals who were beginners to experts who had spent many hours in practice. The skills displayed by the members of the group represented a variety of tumbling and diving stunts in the air, and were carried on twenty feet above the gymnasium floor, between two sets of double bars, fifteen feet apart. These double bars were suspended from the beams of the gymnasium in such a way as to form a permanent and fixed piece of apparatus where practice was conducted regularly each afternoon during the school term. For outdoor practice in the spring, and for the filming of the subjects, a similar piece of apparatus made of piping and somewhat lighter and narrower, was erected in the open air near the gymnasium. (See Fig. I.)

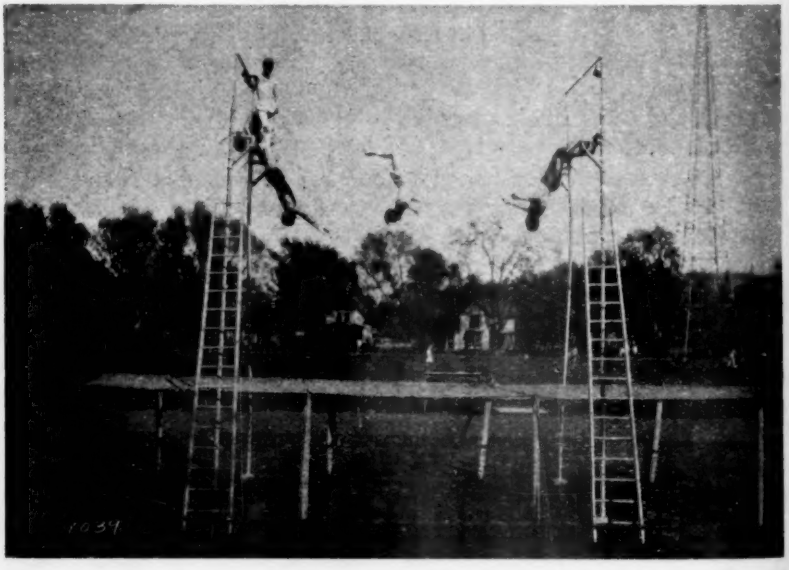


FIG. 1.—Showing apparatus used and an expert performing the flyaway.

In either case, a huge, triple-rope net, fifty-five feet long and eight feet wide was supported by six-foot poles and stretched tight under the apparatus, about twelve feet below the bars, by the use of pulleys and guy ropes.

The subjects, called "flymen" or "fliers," were fairly small and light individuals weighing between 112 and 135 pounds. They were assisted by larger individuals called "topmen," who did not enter into the experiment, except incidentally. Two of the topmen at a time, each hanging by the knees from opposite sets of the double bars, with toes hooked under the rear bars, in turn "caught," "swung," or "helped throw" a flyman. Inasmuch as the flymen were the subjects chiefly under observation, all of the objective measurement reported pertains to these men.

In the present study, several reels of film were taken of the subjects, over a period of three years, while they were engaging in a variety of stunts previously mentioned. The pictures secured in this manner were then used as source material for the making of graphs of performance. This was done in the following manner. With the aid of a hand projector and using graph paper for a screen, every third frame was studied in detail. The position of the various parts of the bodies of the subjects was located on the graph paper by noting where the center of the ear, the center of the shoulder, the center of the hip, the center of the knees, and the center of the ankle fell. Lines were then drawn between these points and thus a silhouette figure of the flyman was created. When these lines were projected beyond one another by extending the head-shoulder line, the shoulder-thigh line, the thigh-knee line, and the knee-ankle line, the angle of movement involved at each point could be measured. Then, by actual measurement with a protractor, an exact measurement could be made of the extent to which the head, for example, had moved with respect to the trunk. In the same manner it was found how much the extended body line fell in front of, directly on, or behind the thigh line. Similarly, it was found how much the extended thigh line fell in front of, directly on, or behind the leg line, and finally, how much the extended leg line fell behind the extended foot line.

This method of handling the data can be best illustrated to better advantage, perhaps by turning to Figure 2. Each of the drawings in this figure shows a silhouette of a flyman as he is in the act of starting a front somersault, or gainor, through the air. As the figure shows, the angular displacement of any part of the body with respect to any other part may be measured. These measurements furnish the major part of the evidence upon which our conclusions are based.

According to Steinhaus[2] experiments in sport carried on in Germany

[2]A. H Steinhaus, "Physiology of Movement and Measures of Coordination," *Journal of Health and Physical Education* (March, 1932), 3:44.

show that the difference between skilled and unskilled athletes is clearly due to differences in the functioning of the nervous system and may, on that account, be taken as measures of learning in coordination. It was felt, therefore, in order to make the present study more comprehensive, that tests of muscular skill should be included. Consequently,

FIG. 2.—The gainor showing silhouette of performance.

all of the subjects in the experiment were subjected to a number of laboratory tests.[3]

After giving the tests to the group the first time, it was decided to limit the second and third trials to the more generally known and accepted tests of muscular skills. A series of thirteen tests of reaction time[4] was also given each subject. The coordination tests used were the Seashore Rhythm test,[5] the Seashore Pursuit test,[6] the Scott Dexterity test,[7] and tests of muscular judgment,[8] tapping,[9] and jumping.[10] In spite of the fact that the personnel of the group varied from semester to semester, due to graduation, withdrawals from school, and with-

[3]Laboratory for Research in Athletics, Men's New Gymnasium, University of Illinois, Urbana, Illinois.

[4]Standard Dunlap Set Up. (Stoelting Machine.)

[5]R. H. Seashore, "Standard Motor Skills Unit," *Psychol. Monog.*, (1926), 39: (No. 2) 51-66.

[6]C. E. Seashore, *The Psychology of Musical Talent*, pp. 175-178. Boston: Silver, Burdett and Company, 1919.

[7]Scott Dexterity Test. An unpublished test used during the World War.

[8]Developed by Dr. C. R. Griffith in the Psychological Laboratory for Research in Athletics, University of Illinois.

[9]G. M. Whipple, *Manual of Mental and Physical Tests. Part I*, pp. 130-146. Baltimore: Warwick and York, Inc., 1914.

[10]D. A. Sargent, "The Physical Test of a Man," *Amer. Physical Education Review*, (1921), 26: 188-194.

drawals from the group, it was possible to put three of the original group through the same battery of tests three times, with approximately six months elapsing between each trial. Four of the group were given the tests twice, with the same interval between each trial, while the remaining seven were put through the tests once.

As a source of further information, the questionnaire method was used. Two types were adopted. It was the aim of the first to learn what the subjects and others in the gymnasium thought about fear, its causes, its effects, and possible means of cure. The second had as its object a description of what the subjects themselves thought of their own performance at each practice, of their successes or failures, of fear or any other factors that might influence their performance, and the possible effect of emotion on their performance. Forty-six individuals, including the 14 subjects studied in more detail, filled out the first questionnaire on fear, while the subjects themselves, and a few others in the same activity, returned 389 copies of the second questionnaire on performance, over a period of three years.

Altogether then, three sets of data were available for our study of the relation between fear and muscular performance. We had, first, a set of measurements of performance gained by moving picture records. This data was set into a background furnished by certain tests of motor coordination and by questionnaire material which in some cases approached the introspective level. This last source of information about the subjects was freely supplemented by empirical observations of the experimenter.

In the original study,[11] representative pictures of two of the most difficult stunts, viz., the gainor and the flyaway, were used, but in the present discussion, the gainor alone will be considered.

The gainor is best described as a front somersault in the air. The flyman or subject is swinging by his hands from the grasp of the topman above him, with his back to the opposite topman, and his head slightly back to watch his partner's face and listen for signals. Near the top of the backward swing, both men release their grasp, the flyman throws his head forward and down (see Fig. 2) and at the same time "tucks" or brings his knees up slightly toward his chest. He passes through approximately half an arc, and catches the wrists of the opposite topman. In practically all of the stunts performed in aerial gymnastics, both men, the flyman and topman, grasp each other's wrists at the completion of each stunt. This responsibility rests with both men, and not upon just one of them, as is sometimes supposed. In a chart of the angles of movement of this stunt, during the swing and after the completion and catch, all angles, except possibly the thigh-leg angles, will be small, and during the actual performance of the stunt,

[11] C. O. Jackson. *An Experimental Study on the Effect of Fear on Muscular Coordination.* Urbana: University of Illinois, 1933.

the head will be in front of the body-line, the body in front of the thigh-line, the thigh in back of the leg-line, and the leg in front of the foot-line.

The numbers in the vertical column at the left indicate the number of degrees of movement, while the numbers on the horizontal line indicate the number of silhouettes examined. All points plotted above the zero or horizontal line, indicate that the subject had his head in front of the body-line, his body in front of the thigh-line, or his thigh in front of the leg-line, as the case might be. All points plotted below

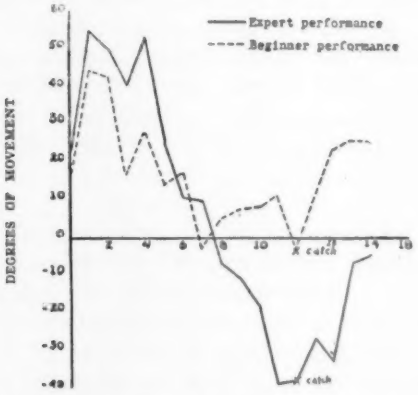


CHART I.—The gainor, showing head-body angles.

the horizontal dividing line indicate that the subject had his head back of the body-line, his body back of the thigh-line, or his thigh in back of the leg-line, respectively.

In our first chart, we find two samples of the head-body angles graphed. These angles are presented first, because they appear to be the most significant in a study of this type. The two lines represent angles of movement of the head with relation to the body of an experienced performer, who had spent four years learning the activity and was the best performer in the group, and a beginner, who had just completed six months' practice and was a very poor performer. The contrast between the two sets of performance are so apparent that both will be discussed together.

In the case of the experienced subject who performed well, we notice a fairly smooth rise as the head was brought forward to bring about the forward movement turn, and then the rapid return to normal and a movement below the zero line on the graph as the head is brought back to keep the opposite topman in view and get ready to make the catch. The beginner starts his movement much the same way with the exception that he does not have as great a forward movement of his

head, but from that point on the variations are more startling. After reaching the normal position the subject again brings his head forward and although it returns to the normal position as the catch is made, it is immediately brought forward again. The angles of movement, as might be expected, are smooth and well coordinated in the case of the expert and broken and abrupt for the beginner.

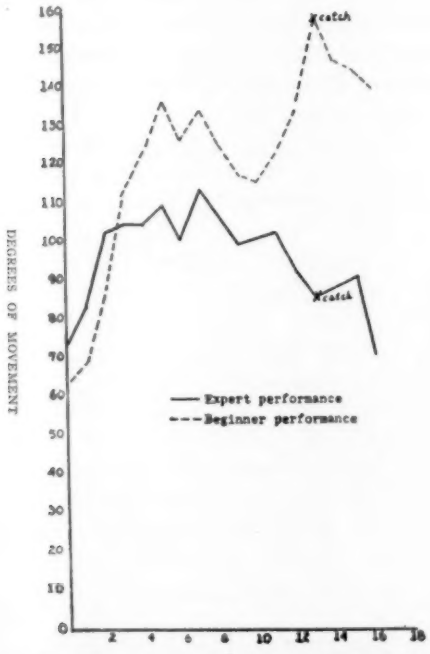


CHART II.—The gainor, showing the body-thigh angles.

In Chart II the study of the same two individuals is continued, with the body-thigh angles of movement pictured. Again, much the same thing is apparent, with a smooth rise in the "tuck" or the lift up of the knees in order to make the turn, in the case of the expert, and a much greater rise in the performance line of the beginner as he tries desperately to carry through with the movement. The greatest difference comes near the finish, however, when the beginner has a much greater tuck than at the beginning. In other words, his lack of coordination and his inexperience, coupled possibly with indecision and some fear, caused him to continue increasing his tuck when relaxation should have taken place.

In Chart III, after the initial change when thigh-leg angle is greatest,

due to the "tuck," the line of the expert rises smoothly until, shortly before the catch, it approaches the zero line. The performance line of the beginner does not show as great a change at first, but then abruptly changes so that at the time of the catch, the angle of movement is almost as great as that of the expert at the time his movement begins. The tuck continues even further as the graph indicates.

The original study contained a total of sixty-five pages and included eleven pages of graphs, three figures, and eight tables. In this brief paper, most of that material, as well as the major part of the discussion was either condensed or eliminated. Consequently, no further attempt will be made to present or discuss additional graphs of performance.

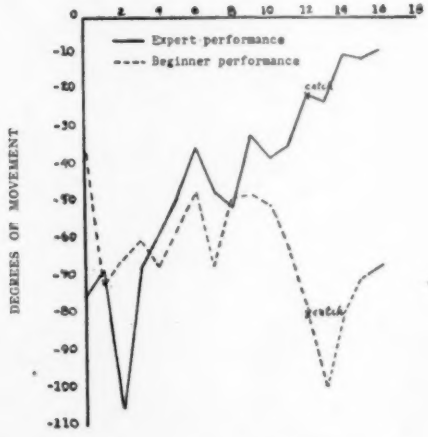


CHART III.—The gainor, showing the thigh-leg angles.

SUMMARY AND CONCLUSIONS

The fear questionnaire indicates that fear is present in the majority of cases, and is due to height, inadequate support, and imagination. The performance questionnaire shows that fear is most likely to be present with a beginner because lack of experience tends to make the emotion more prominent. New stunts are apt to cause various degrees of fear, especially the first few times they are tried. Previous experience, i. e., dangerous falls in the activity or elsewhere, previous injuries, and observation of accidents or near-accidents are apt to induce fear when the subject tried other, or similar stunts. Perhaps the most important conclusion reached was the all-important part the topman plays, not only in the performance itself, but in the presence or absence of fear. The questionnaires as well as observation by the writer and discussions with the subjects themselves, indicate that a new topman results in less confidence. Likewise, a topman, who because of carelessness or lack of ability, has caused

a flyman to miss a stunt or receive a hard fall, is avoided whenever another topman, in whom the individual has confidence, can be secured. Fear seems to be most prevalent in those stunts where, if the stunt is missed, possibilities of injury may be greater. These are stunts where the feet are higher than the head, dives, and those in which the performer turns over. This is the case with the gainor and the flyaway.

Fear tends to be eliminated with successful experience, and this may be brought about by the help of experienced topmen in whom the subject has confidence. In addition, the stunt should be learned by stages, i. e., by observation, explanation, demonstration, and preliminary trials in the safety belt. Later when the "feel" of the stunt has been secured, and the stunt itself successfully performed a number of times, it may be tried without artificial support.

There seems to be some correlation between the mental and the physical state of the performer, his performance, and his susceptibility to fear. A subject who is depressed, or who is tired or ill, can seldom perform as well as he will under more ideal conditions. Likewise, fear is more apt to be present under these circumstances. Fear developed in this way not infrequently results in hard falls to the net, with the possibility of injury, and nearly always, a loss in confidence. Empirical observation, as well as a close study of the performance questionnaires, indicates this correlation so strongly that the writer makes it a practice to watch for signs of fatigue as shown by signs of lack of zest and by unreasonable variations in performance. At the first indication of fatigue such subjects should be sent away from practice. It is a fact that of the few who have been severely bruised or injured in this activity, almost all were hurt because they performed or continued to perform when their muscles were too fatigued or weak to properly control the body. Likewise, lack of proper rest, particularly sleep, coupled with excessive effort expended in school work, may place most of the subjects below normal in their performance.

The tests given the subjects in the laboratory apparently cannot be fully accepted as a true indication of ability in gymnastics. It must be considered, however, that this part of the study could not be carried out as completely as the other parts of the experimental work for a number of reasons. Only three could be given the tests as many times as originally planned to secure comparable averages. Likewise the range of experience of the fourteen subjects used in the study, varied from one week to two years, and the ability from that of beginners to that of experts. Although the tests gave some of the best performers lower scores than were achieved by poorer performers, it is entirely possible that, given the same amount of practice, these beginners might show as much or more progress. It will be interesting to experiment further with these tests.

The moving pictures and the graphs of the various angles of the body drawn from them show a distinct difference between the skillful, well-coordinated performance of some of the experienced men as opposed to the awkward, poorly coordinated attempts of some of the beginners. The experienced subject shows a much smoother, better coordinated performance, as indicated by the rise of the graph line at the start of the turn, and the more or less smooth drop of the line when the stunt has been completed.

Without question, the emotion of fear tends to make the individual give a performance similar to that of the beginner. Moreover, there is a jerky, ill-coordinated quality to such movements which nearly always end in a miss and an unexpected fall to the net. The subject "breaks his swing," "hangs on too long to the topman's hands," or "fails to start and carry through his turn properly," and in general, gives definite evidence of his inability to make up his mind. This is shown by the tendency to go to extremes as mentioned in the discussion of the angles of movement. In one or two instances, as indicated in the questionnaires, fear apparently makes the individual try harder, although the smoothness of the performance is undoubtedly still affected.

Inasmuch as a method of approach, rather than conclusive evidence was sought in this study, the most important result has been the creation and standardization of a method of measuring, with some degree of accuracy, variations in the performance of physical skills, which may or may not be due to fear. This opens the way to other interesting and more comprehensive investigations which may go further in answering such questions as we have asked.

Criteria for Judging a Golf Knowledge Test

By Mary Agnes Murphy
The Texas State College for Women, Denton

THE TEST of golf knowledge used in this study was written the fall of 1930. The test has been used in the testing and grading of golf knowledge of young women classified in required freshman and sophomore classes in the Physical Education Department of the Texas State College for Women.

The average length of the course of instruction in skills, technique, and information in golf was six and one-third weeks or nineteen school days. The type of teaching was lecture, demonstration, practice, and criticism. Skill tests in achievement in driving, approaching, and putting were used.

This study is written to present the criteria for judging the golf knowledge test; it will not consider the method of teaching or the skill tests used.

VALIDITY OF TEST

The test items were taken from the following texts:

Barnes, James M. *A Guide to Good Golf*. New York: Dodd, Mead and Company, 1930.

Brown, Innis. *How to Play Golf*. No. 4B Spalding's Athletic Library, New York: American Sports Publishing Company, 1929.

Jones, Robert Tyre, and Keeler, O. B. *Down the Fairway*. New York: Minton, Balch and Company, 1927.

Rice, Grantland. *Golf Guide*. No. 3X Spalding's Athletic Library, New York: American Sports Publishing Company, 1930.

Travers, Jerome, and Crowell, James R. *The Fifth Estate*. New York and London: A. A. Knopf, 1926.

Vardon, Harry. *The Gist of Golf*. New York: George H. Doran Company, 1922.

"Use" was one of the criteria upon which the material for the test was gathered. As the emphasis is placed on learning new material, the test to measure the course was selected on basis of frequency of use.

The material was selected from a list of two hundred items obtained from six textbooks and twelve articles.

THE RELIABLILTY OF THE TEST SCORES

A correlation of the scores was based on the result of giving the golf knowledge test to a group of 89 young women and then repeating the same test six and one-third weeks later. The reliability coefficient was

found to be .64 with a probable error of .04. The low correlation is probably due to the fact that the girls looked up answers to the points they did not know between the administrations of the test and to the fact of informal class instruction.

THE SELF-CORRELATION OF THE HALF-TEST

The coefficient of reliability from one application of the test was obtained by making up two independent sets of scores by combining alternate exercises in the test.

The reliability coefficient of the half-test was found to be .76.

The reliability of the whole test was obtained by applying Spearman's formula to the reliability coefficient of the half-test, and was found to be .86. This correlation is sufficiently close to .9 that the test could be considered reliable.

THE STANDARD ERROR OF ESTIMATES OR STANDARD ERROR OF MEASUREMENT

When students repeat tests or take another form of the test, the score on the second repetition or on the second form may change. The standard error of estimate or the standard error of measurement, for the repetition of the test was found to be 6.66. Thus a student whose score is 60 on the golf knowledge test in 68 out of 100 chances will make a score between the limits 60 ± 6.66 or 53.39 and 66.66 points.

With the self-correlation of the golf knowledge test .64 as explained above and a self-correlation of the half-test .86, it would seem that the correlations were satisfactory or adequately high.

PREDICTING GOLF SCORES FROM AN INTELLIGENCE TEST

Of the 408 young women who were given the golf knowledge test as a final test, 300 scores of Thurstone's "Psychological Examination for College Freshmen and High School Seniors" (an intelligence test) were available. The correlation coefficient was found to be a .45. The standard deviation of the psychological test was 50.80 and for the golf knowledge test, 11.85. The mean score for the psychological test was 121.4 and for the golf knowledge was 64.1. The regression equation in score form for predicting the most probable golf score of an individual whose psychological score is known is:

$$Y = .106X + 51.3,$$

where $Y =$ golf score and

$X =$ intelligence score.

THE AVERAGE OR NORM AND SIGMA INDICES

The average grade of the 408 golf scores was found to be 64.90, and the variability of the group was 11.85. In reporting the norm of the group of 408 students who participated in the golf knowledge test a method of turning scores into letter marks is given which may be seen in Table I.

TABLE I

THE LETTER GRADES OF GOLF KNOWLEDGE SCORES, THE RANGE IN SCORES, THE NUMBER AND PERCENTAGE ACCORDING TO A RANGE OF SIX SIGMA AND FIVE SIGMA

	6 Sigma			5 Sigma		
Letter Grades	Scores	No.	Per Cent	Scores	No.	Per Cent
A.....	Above 87	6	1.47	Above 84	13	3.19
B.....	73–86.9	80	19.61	72–83.9	94	23.02
C.....	58–72.9	188	46.08	59–71.9	158	38.73
D.....	44–57.9	115	28.19	47–58.9	113	27.7
F.....	Below 43.9	19	4.66	Below 46.9	30	7.35

Symonds[1] states that in grading the plan which is most widely accepted to insure uniformity of standards is the use of the normal probability curve.

The question arises as to what is the general level of ability of the group of students who participated in the golf knowledge test. One might question whether a letter distribution of five sigma for the total range of the psychological marks approximate the letter distribution of golf knowledge scores and whether both the distribution of golf knowledge scores and the percentage distribution of psychological scores approximate a normal probability curve.

Table IIa gives the psychological scores of the 300 young women according to letter grade, number, and percentage according to 5 *S.D.*; and Table IIb gives the number and the percentage distribution according to a normal probability curve:

TABLE IIa

PSYCHOLOGICAL SCORES		
Letter Grade	No.	Per Cent
A	25	8.33
B	58	19.33
C	112	37.33
D	92	30.66
F	13	4.33

TABLE IIb

NORMAL PROBABILITY CURVE	
No.	Per Cent
21	7
72	24
114	38
72	24
21	7

In comparing Tables I, IIa, and IIb it will be readily seen that percentages in the distribution of the 5 sigma approximate closely the percentages in the normal probability curve except in the percentage of *A's* and *D's*. If normal probability curve was used, instead of the letter distribution of 5 sigma based on the frequency of the golf knowledge scores, 29

[1] Percival M. Symonds, *Measurement in Secondary Education*, p. 510. New York: The Macmillan Company, 1929.

students would be given a grade of *A* instead of 13, and 97 students a grade of *D* instead of 113.

SCALING OF THE TEST

Symonds[2] states that, providing certain general cautions are observed, it is permissible merely to arrange the items that a test is composed of in order of difficulty without paying further attention to scaling.

There should be no zero scores and no perfect scores among the test elements, as both are undistributed scores. Some elements in the test should be of such difficulty that no pupil in the class will get a perfect score.

A correlation was made between the per cent of right answers on each item of tests given at the beginning and end of a period of instruction. The period of instruction for each group was 19 days. The correlation coefficient was found to be .94 with a probable error of .008.

The same experiment repeated with another group was made, that is, the difficulty of a question on the initial test was correlated with the difficulty of that question on the terminal test made by the same group of students at the end of a period of 19 school days' instruction. The correlation coefficient was found to be .63 with a probable error of .004 as may be seen in Table III.

The range of difficulty of question may be seen in Table III as well as the mean difficulty. The range of difficulty for the groups was found to be less divergent after instruction than before. The mean difficulty of question is somewhat higher than Symond's[3] recommendation that the

TABLE III

CORRELATION OF PERCENTAGES OF RIGHT ANSWERS

	Number of students	Number of questions	Mean	Range	Standard Deviation	Probable error of distribution	$S D_m = \frac{S D}{\sqrt{n}}$	$P.E._m = S D_m \times .6745$	Coefficient of variability $C.V. = \frac{S D \times 100}{M}$	Coefficient of correlation between pretest and final test	$P E_r = \frac{.6745 (1-r^2)}{\sqrt{n}}$
Fall 1930 ..	162	93	62.5	1–99	21.7	14.64	2.25	1.52	34.72		
Spring 1931	92	93	71.2	5–93	21.8	14.7	2.26	1.52	30.62	.94	.008
Fall 1931 (12-2-31) 102 students ...	102	93	59.8	3–97	24.9	16.80	2.58	1.74	41.63		
Spring 1932 (1-20-32) 102 students ...	102	93	75.4	18–96	17.2	11.60	1.78	1.20	22.81	.63	.004

[2] Symonds, *Op. cit.*, p. 301.
[3] Symonds, *Op. cit.*, p. 301.

general difficulty should be such that the mean score of a class is equivalent to 50 per cent of the total possible score.

The scaling of the golf knowledge test may be seen in an article, "Grading Student Achievement in Golf Knowledge." In that article T-scale scores are given of initial and terminal tests as well as a T-scale for a group of 408 scores.

The scoring of the test was objective, and all tests were scored by a key. Directions as to how to take the test were included with the test. The test as used was mimeographed.

SUMMARY

In this article have been discussed criteria for judging a golf knowledge test. One standard for devising valid test items has been proposed. The items were chosen from recognized texts in the field and chosen on the basis of frequency of use. The reliability coefficient of the test was found by self-correlation of the whole test and half-test. The degree of reliability of the correlation coefficients obtained was satisfactory or adequately high. The score form of the regression equation was calculated.

The average or norm and sigma indices are included for purposes of grading. There is included the frequency of general level of intelligence for the group of three hundred young women to be compared with the normal probability curve in determining grades.

In this study a letter distribution of five sigma approximates the percentage distribution of a normal probability curve more closely than the percentage distribution of the psychological scores or the level of the ability of the group.

The range of difficulty of the test after instruction was found to be less divergent than before instruction.

GOLF KNOWLEDGE TEST [1]

Prepared by Agnes Murphy

Name.....Date.....Score.....Phy. Ed. Sec.....
Name Instructor.....Classification.....Major.....

Directions: About one-half of the following statements are true, and about one-half are false. Mark each true statement with a plus sign on the dotted line at the left of the statement. Mark each statement that is partly or wholly false with a zero on the dotted line at the left of the statement.

50 True-False on General Information on Technique [2]

1...A wide stance is preferable to a narrow stance.
2...One must "get his body" into a tee shot to gain distance.
3...The radius of one's swing extends from the joint of the left shoulder to the clubhead.
4...On the downswing the left arm should be bent.
5...The left hand and arm should be a "passenger" on the downswing.
6...A narrow stance enables one to turn freely at the hips.

[1] Copyright, 1933, by M. Agnes Murphy.
[2] A key and interpretation of questions will be furnished to those who wish to use this test.

7...In order to get weight into tee shots a free body turn or pivot is necessary.
8...A worth-while tip is, at the top of your swing, to have the heels of your hands seemingly pushed forward.
9...A rigid left arm is necessary in driving.
10...At the top of a swing the right arm is straight and the left elbow is close to the left side and pointing down to the ground.
11...One should depend upon roll and not upon carry for distance.
12...The clubhead should meet the ball at the lowest point of the swing-through.
13...The loft of the face of the driver, and striking the ball at the lowest point of the swing-through causes the ball to fly upward.
14...The right knee bent slightly toward the ball and slightly inward toward the left causes the right side to tighten during the swing.
15...The main idea of the swing is to hit the ball.
16...Golf, especially driving, is done with the right arm in control, a straight right arm, too.
17...A stiff right knee tends to brace the right side and to make for correct right hip action during the backswing.
18...The weight should shift to the ball of the sole of the right foot on the backswing.
19...Golfers who average exceptional distances from the tee, use little wrist action in the swing.
20...Players who use plenty of wrist action drag the club back, the hands leading because the left wrist is bent so that the hand points toward the ball.
21...In driving the clubhead should be taken back from the ball (along the line of flight extended back of it) for as great a distance as possible.
22...Swaying is caused by good pivoting.
23...A narrow stance tends to make one sway.
24...The left arm in control on the backswing tends to push the head of the club out from one beyond the line of flight.
25...A player with a wide stance places the ball to the right of a point off the left heel.
26...A player with a narrow stance plays his ball off the left instep.
27...At the top of a swing for a drive the right elbow should be out from the body and point backward.
28...The grip of the right hand should be tight on the first part of the downswing.
29...Pressing concerns itself with hitting too late.
30...Most golf faults come from trying too hard.
31...The loft on all wooden and iron clubs, graduating in scale from the 80 per cent of a driver to the 50 per cent slope of a niblick, supplies the angle of carry.
32...The left wrist should be bent a bit at address and that hand permitted to take back the club.
33...Pressing is hitting too hard.
34...Every ounce of power may be applied through proper timing.
35...At the end of a pitch shot, the right hand is over the end of the club.
36...In heavy rough, the mashie should be taken back low and close to the ground with the left hand.
37...On a pitch shot speed is the dominating feature.
38...One point all crack "pro's" have in common is a hip slide.
39...A hip slide, is the gliding forward of the hips on a line parallel to the line from the ball to the pin.
40...Most players on a pitch shot hit the ball too soon.
41...In mastering the run-up shot the head must be kept down and stroke on through after contact in such manner that the clubhead will follow on line after the ball.
42...The loft on the chip shot should be sufficient to make the ball bounce over the last third of its journey.
43...The chip shot should be played from a point midway between the feet.
44...To prevent the arms getting away from you on the run-up shot place the left forearm on the left leg.

45...On a pitch shot the club should be taken back with the right hand with only a wrist movement.
46...To pitch over a bunker a right hand control with a bent left wrist raises the clubhead more quickly from the turf.
47...In putting, the players are advised to use a tight grip.
48...A short putt missed does not count as much as a long drive.
49...The head of the putter should be kept low along turf in going back and higher in hitting through after the ball.
50...Players who stand with feet well apart in putting usually place most of the weight on the left foot.

13 Points on Recall of General Technique

1. When your hands or body or both get ahead of the clubhead, it is called.....
2. Hurry your backswing, and not only overswing, but pull yourself off.....
3. On the backswing control is lost when the.....get too far back.
4. The follow-through is a result of swinging the.....through the ball from inside the line of flight with the.....following low and close to the ground before and after contact.
5. After contact with the mashie, the knuckles of the.....hand and palm of the.....hand are up.
6. For thick rough, grip mashie with the.....two fingers and thumb of each hand and wrists.....
7. To lift a mashie quickly in thick rough, lift it with the.....hand.
8. The left thumb placed down the back of the leather will stop the.....on little chips and pitches.
9. On a chip shot one should guide the.....with necessary exactness.
10. Do not take.....on the chip or run-up shot.

30 Points of Matching Terms on General Information

Write on the dotted line to the left of letters of the alphabet the proper numeral that associates the truest meaning.

Shots

1. Pitch	...a. Distances up to twenty yards
2. Lofted shot	...b. Bunker
3. "Explosion" shot	...c. Deep bunker
4. Ordinary swing with mashie	...d. Accuracy dominating feature, with all the "stop" possible
5. Chip	...e. Shallow bunker

Drives

1. Keep right knee slightly bent throughout backswing	...a. With the distance to be traversed
2. Swaying	...b. Shoot to the right
3. Length of swing varies	...c. Lowest point of the arc
4. Iron shot, elbow bent when contact made	...d. To prevent the right hip from swaying back or becoming rigid
5. Clubhead gains maximum velocity	...e. Leaning the body out to the right and gather the arms there for a hit

Clubs

1. A compromise between a niblick and midiron	...a. Niblick
2. To be used when the ball lies in bad places, as ruts, weeds	...b. Spoon
3. A club with a convex face	...c. Mashie

4. An iron headed club of considerable driving power	...d. Cleek
5. A wooden-head club fashioned so as to lift the ball	...e. Bulger

Terms

1. One under par for a hole	...a. Down
2. A reverse spin imparted to the ball which prevents roll	...b. Draw, hook, or pull
3. Competition by hole	...c. Away
4. Competition by strokes	...d. Face
5. Ball to be played first	...e. Dormie
6. The part of the club which strikes the ball	...f. Medal play
7. To drive widely to the left	...g. Birdie
8. To elevate the ball	...h. Cut
9. The number of holes or strokes a player (or match) is behind opponent	...i. Match play
10. As many holes ahead as there remain to play	...j. Loft

Miscellaneous

1. Putting	...a. Left foot advanced
2. To keep the ball low	...b. Lack of body motion
3. Closed stance	...c. Lowest point of arc
4. Tendency to look up before actually hitting the ball greater when	...d. Short game is being played
5. Maximum velocity	...e. Play it more off the right foot, with the weight on the left

An Improvement in Technique for Measuring Antero-Posterior Posture*

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INTRODUCTION

STANDARDS have been set up in attempts to measure nearly all kinds of school activity. Some of these standards have been refined to an extent where the results in one school system may be quite satisfactorily compared with those of other school systems. In late years that part of the school activity which has to do with physical education and health has been very forcibly placed before school patrons and school administrators. This type of work is probably less standardized than most other phases of school work because of its comparatively recent position as an integral part of the school curriculum. In the realization of objectives, most school work deals with the larger part of the school population. This is also true in the field of physical corrective work. After the objectives have once been established in our corrective work, we do not deal with the larger part of school population but with the individuals who deviate the farthest from these objectives.

The literature in the field of physical education as a whole has grown very rapidly during the last decade. Nearly every phase of body mechanics and human physiology has been treated. In this thesis, however, I am attempting to deal with only one of the tools of physical education—that of accurately evaluating posture.

There are at least two distinct phases to the work on posture which must be taken into consideration before anything can be done towards studying any assumed relationship between posture and the functions of the human body. First, one must procure some dependable picture or outline of the body. Secondly, one must be able to set a reliable value to this outline or picture. Several methods have been used to procure the outline or silhouette.

The *Schematograph* was invented by Dr. C. Mosher and Professor Lesley.[1] A reflecting mirror is placed at an angle of forty-five degrees in an Eastman Kodak or graphlex. Ordinary tracing paper is generally used for records of poses. The subject is placed in position and the silhouette is traced while the pose is held. This tracing is then reflected upon a curtain.

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* A thesis submitted to the Graduate Faculty of the University of Minnesota, in partial fulfillment of the requirements for the degree of Master of Arts.

[1] George T. Stafford, *Preventive and Corrective Physical Education*, New York: A. S. Barnes and Co., 1925.

The *Silhouetteograph* was invented by Norman Fradd formerly of Harvard [2] and director of the Hemenway Gymnasium. This technique replaced that of Mosher and Lesley and has been widely used. Some excellent methods of procuring silhouettes are described in a late work of Bovard and Cozens.[3]

Dr. Joel Goldthwait of Harvard developed a later system where posture groupings are not based on *"A," "B," "C,"* or *"D"* postures. He begins by taking a picture of the object, preferably X-ray. Next he places four dots on the resulting silhouette, at the following points; mid cervical at level of jaw angle, mid dorsal, mid lumbar, and pelvic. A straight line is passed through the two upper points and another line through the two lower points. The value of the posture is determined by the angle at which these two lines intersect. If the angle is from one to ten degrees a value of *"A,"* is recorded; if from eleven to twenty degrees, a *"B"*; if from twenty-one to thirty degrees, a *"C"*; and if from thirty-one to forty degrees, a value of *"D"* is recorded. Dr. Goldthwait attempts to improve both the method of procuring the silhouettes and of evaluating them.

Brownell's contribution to the field of posture work is probably more far-reaching in its effects than any other similar treatment to the present time.[4] He sets up a scientifically arrayed series of silhouettes. These are selected and placed in such a manner that they are one P.E. apart near the extreme ends of the scale and one-half P.E. apart near the middle of the scale. These values may be directly applied in the mathematical equation. Since this part of the work has been accomplished for a certain range of ages for boys, the problem narrows down to determining a technique for evaluating postures on this scale which shall be simple, accurate, and inexpensive in its perusal. The statement of the problem may be as follows: an improved technique for measuring antero-posterior posture.

TECHNIQUE AND PROCEDURE

The purpose of the study is to provide an improved technique for evaluating antero-posterior posture. A film slide kodak was used to take the silhouettes. This kodak uses regular thirty-six m.m. film which can be printed directly on the thirty-six m.m. film roll. This film is then ready for use in the projection lantern for the purposes of comparison and evaluation. A picture can be taken in an instant, and the cost in quantity is a few cents for each silhouette.

Two types of comparisons were attempted. In the first, the silhouettes of 27 upper grammar grade boys were compared directly to the standards

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[2] E. L. Fradd, "New Method of Recording Posture," *Journal of Bone and Joint Surgery*, 5:757-8 (October, 1933).

[3] J. F. Bovard and F. W. Cozens, *Tests and Measurements in Physical Education*, Philadelphia: W. B. Saunders Co., 1930.

[4] Clifford Lee Brownell, *A Scale for Measuring the Antero-Posterior Posture of Ninth Grade Boys*, New York: Teachers College, Columbia University, 1928.

for evaluation.[1] In the second, these silhouettes were superimposed on the standards by means of a projection machine for evaluation.[2] Four judges were selected to make the evaluations in both methods. The judgments of each judge were compared in turn with the judgments of the other three judges.* In this manner six comparisons were procured from the four judgments. The deviations in judgments between the judges were tabulated to determine the possible agreement or disagreement.[3] In the direct comparison there was a great deal of disagreement.[4] The mean deviation was 26.7 with a range of 90 out of a possible 100.[5]

In the comparison through superimposition by projection there was very close agreement. The range was 20 and the mean deviation 2.85. A silhouette which fell on or near the standards gave the judges no difficulty.[6] The silhouette which fell midway between two standards or portrayed some peculiar or unusual posture caused disagreement amongst the judges.[7] When it was evident that the value of the silhouette was higher than one standard value, but lower than the next, the disagreement seemed to come from attempting to determine the nearest scale value.

TABLE I

JUDGES' EVALUATION OF SILHOUETTES WHEN COMPARED DIRECTLY TO PICTURE OF BROWNELL'S STANDARDS[8]

Picture No.	Silhouettes — Judge No.				Picture No.	Silhouettes — Judge No.			
	I	II	III	IV		I	II	III	IV
1.....	114	98	88	120	15.....	108	88	68	120
2.....	114	106	106	120	16.....	78	98	88	114
3.....	106	60	32	106	17.....	42	68	88	98
4.....	88	106	52	120	18.....	42	24	20	98
5.....	88	52	42	78	19.....	106	88	88	106
6.....	68	60	24	114	20.....	120	114	106	120
7.....	68	60	68	114	21.....	114	114	88	88
8.....	106	106	32	144	22.....	32	32	32	32
9.....	52	88	52	106	23.....	60	32	106	114
10.....	114	114	88	114	24.....	42	42	68	114
11.....	98	120	106	114	25.....	114	114	114	120
12.....	52	106	20	98	26.....	98	78	42	98
13.....	78	114	60	120	27.....	106	98	98	120
14.....	68	78	52	114					

Mean Deviation = 26.7

[1] When standards are spoken of as such in this problem, reference is made to those set up by Brownell.

* These standards were enlarged about eighteen diameters.

[2] Tables I and II.

[3] Figure 1.

[4] Figure 2.

[5] Table III.

[6] Figure 3.

[7] Figure 4.

[8] Clifford Lee Brownell, *Op. cit.*

TABLE II

JUDGES' EVALUATION OF SILHOUETTES SUPERIMPOSED UPON ENLARGED STANDARDS

Picture No.	Film Slides — Judge No. I	II	III	IV	Picture No.	Film Slides — Judge No. I	II	III	IV
1.....	120	120	120	120	15.....	120	120	114	120
2.....	120	120	120	120	16.....	106	88	88	106
3.....	78	88	88	88	17.....	106	106	88	88
4.....	120	120	120	120	18.....	88	88	78	88
5.....	68	68	68	68	19.....	106	106	106	106
6.....	78	88	88	88	20.....	120	120	120	120
7.....	106	106	106	106	21.....	114	120	114	114
8.....	120	120	120	120	22.....	52	52	52	52
9.....	88	88	88	88	23.....	68	78	78	78
10.....	114	106	106	106	24.....	42	32	32	32
11.....	120	120	120	120	25.....	114	106	106	106
12.....	114	114	120	114	26.....	52	52	52	52
13.....	114	120	120	120	27.....	68	78	88	78
14.....	106	106	106	106					

Mean Deviation = 2.85

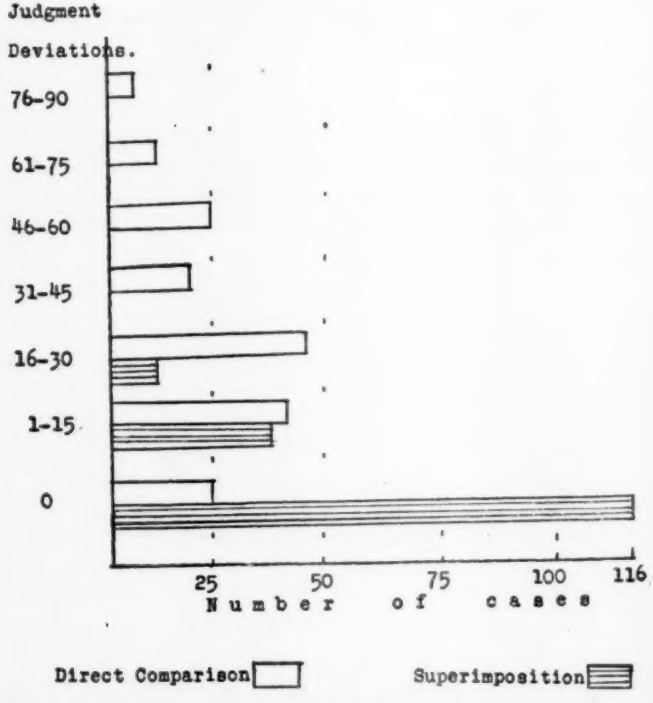

FIGURE 1.—Comparing Deviations in judgments by direct comparison and superimposition by means of projection

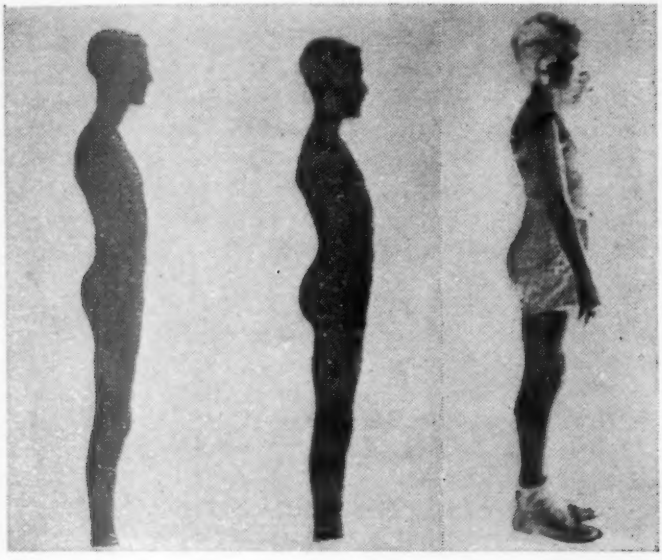

FIGURE 2.—Direct comparison of silhouette to standard*

TABLE III

DEVIATIONS IN JUDGMENTS, DIRECT COMPARISON, AND SUPERIMPOSITION

Judgment Deviations	Frequency	
	Direct	*Superimposition*
85–90	2	—
78–84	4	—
71–77	8	—
64–70	1	—
57–63	2	—
50–56	13	—
43–49	12	—
36–42	12	—
29–35	5	—
22–28	21	—
15–21	17	9
8–14	30	25
1–7	10	12
0	25	116
Median	21.1	0
Q_3	43.37	10.7
Q_1	8.78	0

* The illustration to the left is a photographic reproduction of two of the standards. The illustration to the right is a photographic reproduction of a film slide enlarged to the size of the standards. These were used in the method of direct comparison.

The judges which were selected to estimate the values of the silhouettes were not all physical training people. Judge I had absolutely no experience with physical training or with posture work. Judge II had a little experience with evaluating silhouettes, but did not have any physical education training. Judges III and IV were both physical training teachers. The deviation in values between the various pairs of judgments are

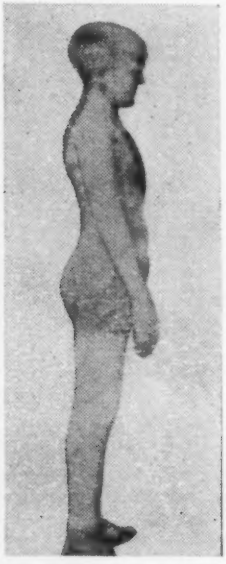

FIGURE 3.—Comparison by superimposition. Absolute agreement[9]

FIGURE 4.—Comparison by superimposition. Disagreement[10]

so small that no reliability can be attached to the results in attempting to determine the most accurate judge. The results seem to indicate that to read posture values does not require physical education training. A more extended study with a great many more cases would be necessary to arrive at a definite conclusion.

SUMMARY AND CONCLUSIONS

In attempting to evaluate posture work for practical purposes in physical training four general divisions have been made, *"A," "B," "C,"* and *"D."* This rather coarse division has been carried out, probably, because of the difficulty in classifying silhouettes into a more refined cate-

[9] This is a photographic reproduction of a standard upon which a film slide has been projected. The standard and the antero-posterior posture of the subject conform very closely.

[10] This is a photographic reproduction as in Figure 3. The judgments did not agree. The value of the posture evidently falls between two standards.

gory. The standards of Brownell have been established for some time.[11] With a technique for determining the silhouette values according to these standards it should be possible to draw some accurate conclusions in the field of posture as pertaining to physical education. Several factors are very evident in their attribution to a more accurate evaluation of silhouettes. It is very important to get a natural silhouette of the subject. It would seem that this is accomplished by a picture taken under as nearly normal conditions as possible. A tracing cannot be as accurate as a picture. When this accurate picture is enlarged through projection, there is no loss in the accuracy of the copy.

The height of the subject has no effect upon the ability to compare it to the standard. If the subject is so tall as to produce a silhouette that would project too large for the standard, decreasing the distance between the projector and the standard will make the projection smaller. If the subject is smaller than average, the opposite procedure is necessary.

The most important factor in this technique is the possibility of superimposing the silhouette of the subject directly upon the standards. The person evaluating the posture of the silhouette can determine its position on the scale very accurately, even at a glance. According to the method of direct comparison of silhouette to standards, a judge might give a "*B*" silhouette a value of "*D*" once out of every five times. A disagreement of such magnitude did not happen once out of 162 times using the method of superimposition. Furthermore, should it be advantageous, an even finer array of standards could be used.

With an accurate evaluation of posture there are a great number of problems that present themselves. In fact, the number of studies that have been attempted or might be undertaken seems very imposing. A few such studies are—the purported relationship between a certain type of posture and health; the effects of posture upon body mechanics, fatigue, mental efficiency, punctuality, etc.; the necessity of determining different standards for age levels far apart; and, the possibility of using the same standards for both sexes.

But, such studies cannot be undertaken until an accurate method has been evolved for judging posture. The technique just described is, we think, an improvement upon any thus far used. It possesses a degree of great precision and enables judgment on posture to be made by unskilled judges. As such it should be of use in the study of any of the problems mentioned above.

[11] Clifford Lee Brownell, *Op. cit.*

APPENDIX

The silhouettes in this experiment have been taken with an Ansco Memo slide film kodak. Other makes may be used if they are of such a type that the negative may be developed on a slide film for projection. The projection machine may be the ordinary classroom projector type. Should it be of the type used for glass slides, an attachment may be purchased which in most cases will convert the projector into a film slide machine. In this experiment an attachment was used which was purchased from the Spenser Lens Company. The standards were traced in black outline on mechanical drawing paper. The outline should not be wide. If it is quite narrow but distinct, the variations in the comparisons can more readily be determined.

ACKNOWLEDGEMENT

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A Practical Electro-Mechanical Race Timer

By LYLE WELSER
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I. NEED FOR ELECTRIC TIMING

PERHAPS the real reason for the use of electric timing is to give to all competitors in race events *equality* and *fairness*.[1] To do this is by no means a small task, even with the use of the "up-to-the-minute equipment." There remains little or no doubt today, after the vast amount of experimenting which has gone on in different parts of the country, that our old methods of having three timers press watches at the start and finish of a race is inefficient and unreliable. This is now a proved fact.[2, 3]

There are a few major factors that apparently substantiate this attitude. If these factors are correct, all past established records are looked upon with a degree of suspicion and all new records must have the distinction of being recorded by accurate instruments. It is certain that if past records are to be still recognized, they should come under a separate category.

Some of the factors of untimely methods influencing race time results are as follows:

1. Failure to start the watch at the instant the gun is fired. The time lag due to *reaction time* is always important and present, even in expert timers. It varies in different individuals and frequently in the same individuals.

2. The use of unreliable and inaccurate watches.

3. Anticipation of runners crossing the finish line which frequently results in stopping the watch too soon. A slow reaction time may cause stopping the watch too late.

After summarizing the foregoing possibilities, it should be remembered that each of these items is quite variable and it is utterly absurd

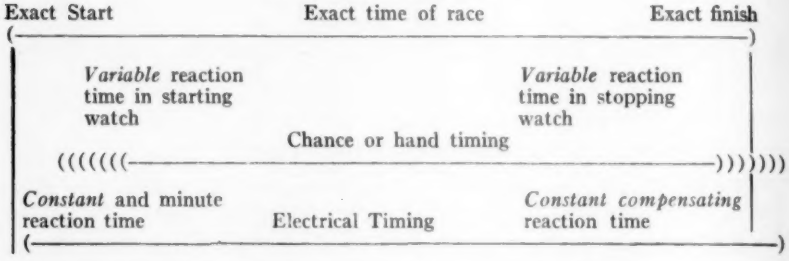
[1]Gustavus T. Kirby. "On The Problem of Timing Races," *Bulletin 17, I. C. A. A. A.* (Nov. 4, 1931), p. 7.

[2]Alan Gould. "Race Timers Unreliable Experiments Disclose," (Summary of Research conducted in Applied Physics Department, International Y.M.C.A. College, Springfield, Massachusetts, by D. E. Coe and T. K. Cureton). Associated Press, New York, July 16, 1931.

[3]T. K. Cureton, Prof. of Applied Physics and Animal Mechanics, and D. E. Coe, Laboratory Assistant, International Y.M.C.A. College, Springfield, Mass. "An Analysis of The Errors in Stop-Watch Timing," RESEARCH QUARTERLY, Vol. IV. No. 2 (May, 1933).

to believe that the results obtained are not likewise variable and consequently unreliable. While experienced or so-called experts may not vary to the extent that novices do, these experts are still susceptible to error. Perhaps the following will help to visualize the problem.

Analytical Illustration



In the first case the exact time is given and if the instrument used were 100 per cent accurate, the length of the line (representing time) would be precisely the same. By *chance* or hand timing as in the second case, the length of the line may be too short, just the same, or too long. Usually it is too short owing to the reasons explained above and runners are given credit for running races faster than they actually do. In the third case the line would be the same length as in the first because the small reaction times at the start and finish cancel.

II. SOME OF THE WAYS OF ELECTRICALLY TIMING RACES.

A. *Kymograph and Tuning Fork Method.*—This method was used in the Physics Department at Springfield College and is essentially a laboratory method of measuring units of time and is not practical for the conditions that prevail on the ordinary race track. It can be used, but the slightest error in operation and even the slightest jar or gust of wind will perhaps dismantle the equipment so that the results cannot be obtained.

B. *Electrical Clocks Operated Manually.*—Devices like these, being operated manually, still have the original objectional features involved even though the instruments themselves may be highly accurate. All the factors that render hand timing unreliable and inefficient, render this method unreliable and inefficient also. Eradicating the human element introduces the type of electrical timing that is described under method "C."

C. *Electrical Clocks Operated Electrically.*—1. The idea here is the same as in "B" except that the device is actuated by a contact at the start and is stopped by breaking the contact at the finish. This type of timer may be very compact. Its chief difference from that in "B" is the eliminating of the human element in starting and stopping. Providing the current is constant and the instrument is accurate and fool-

proof, this method should be quite practical and there would be little grounds on which to condemn it, except for expense.

2. Under this method would come Lobner's[4] of Germany. Lobner is a manufacturer of all kinds of clocks who, for several years has given much consideration to the problems of timing races. Chief amongst his contributions is the device that was experimentally used in the 1928 Olympics. This timer will graphically record the time of each contestant in hundreths of a second and, in addition, give the order of finish. This instrument has many claims for it, especially in Europe where it has been widely known and used. Expense would seem to be the inhibitory factor in preventing its common usage. Although it may be quite elaborate, it is highly commendable.

D. *Stop Watches Operated Electrically.*—1. First under this heading for comment is Kenneth Crook's[5] timer. The main feature employed in this arrangement is the substitution of a light beam and photo-electric cell in place of the usual finish tape. The device is actuated by a contact at the firing of the pistol and stopped by the interception of the light beam by the runner. This method would seem to offer little improvement over the usual tape, provided the tape is sensitive enough, however it can be employed quite satisfactorily. Perhaps it is just more elaborate in doing that which can be done more simply and with less expense.

2. Speakman's[6] method seems to be much along the same lines as that of Crook's in that he also employs a light beam and photo-electric cell in place of the tape. Speakman's timer is different at the start where his device is actuated by the report or sound of the gun. It would seem doubtful that this feature would be of such importance as to be significant.

3. Welser's practical timer which is described in detail a little later in this report is one that is designed to do the job in the simplest and least expensive way. It times only the first place, as do most of the timers mentioned, but in the average high school and college competition this is sufficient. The device has been constructed so that it is very highly foolproof and so the average layman can operate it. Its outstanding features that make it practical are its simplicity, low cost, and accuracy. It seems to be the practical timer. (See page 100.)

E. *Photographical Method.*—1. The "Kirby Two-Eyed Camera"[7, 8, 9] method ranks amongst the best as far as eliminating all doubt

[4]F. L. Lobner (Clock Manufacturer), Berlin W 9, Potsdamer Street 23.
[5]Kenneth Crook. Photo-Electric Timer for Track Events, Thesis, Ohio State University, 1929.
[6]Ed. A. Speakman, "Haverford College Automatic Race Timer," *Athletic Jr.* (April, 1931), p. 18.
[7]Pat Frank, "Two-Eyed Camera Times Speed to a Hundredth of a Second," *New York Times* (Sunday, May 29, 1932).
[8]C. H. Fetter, "A New Way of Splitting Seconds," *Bell Telephone Quarterly* (October, 1932).
[9]C. H. Fetter, Electrical Research Products, Inc., New York, and H. M. Stoller, Engi-

with regard to times and order of finish is concerned and perhaps more nearly approaches the absolute than any other. A record of everything occurring in a race, including the exact instant the timer was started and the order of finish in connection with the exact time of each contestant, is easily possible. Although it is necessary to develop the films before results are available, this is now possible by a process that requires no more than approximately five minutes. It is questionable if the average high school or college could well afford one of these precision timers, but where expense is no factor and where important events such as those at the Olympics are at stake, this timer is one of the choicest bits of engineering that could be employed. This instrument already has proven its worth by settling disputes in the late Olympics and much credit is due to those who have been instrumental in developing such a foolproof method which, of course, permits the crystallization of fairness and equality to all contestants.

III. DETAILS OF WELSER'S PRACTICAL RACE TIMER

INTRODUCTION

The Physics Department at Springfield College was one of the first to appreciate the seriousness of the errors involved in timing races and work has progressed there since the fall of 1929. It was during this study that the need for a practical timer was experienced. The laboratory equipment was not easily set up on the field nor was it easily operable. Then one day Professor Cureton, Professor of Physics and Research, hinted that there was an opportunity here for someone to develop a device that was practical, a device that was highly accurate, and a device that was simple and low priced.

The writer was fascinated by the problem and took it upon himself to develop that type of instrument which answered the demands put upon it. It took over two years of piece-meal experimentation at convenient times to overcome the numerous problems encountered. A finished instrument is not claimed in any sense for the experimental model, but practicability in a large degree is claimed for it owing to its demonstrated simplicity of operation, low cost, accuracy, and reliability.

THE SWITCH AT THE START

Features.—This switch has been designed only after much experimentation and is constructed so that it meets the demands in the best possible way. It attaches quickly and easily to any gun and is easy to operate once understood. The wire plugs into a jack in series with

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neer, Apparatus Development Department, Bell Telephone Laboratories, Inc., New York, "Precision Timing of Athletic and Other Sporting Events." Paper presented at summer convention of A.I.E.E., Chicago, Illinois, June 26-30, 1933.

the start circuit. This is done for convenience and to permit a quick change of gun to the different starting positions for different races.

When the cartridge is fired, the "separator arm" which keeps the contacts open is kicked out by the concussion of the explosion, then allows instant contact *only* on the report of the gun. To reset, the arm is simply swung downward and back into position which again separates contact points. It can and should be reset immediately after every start.

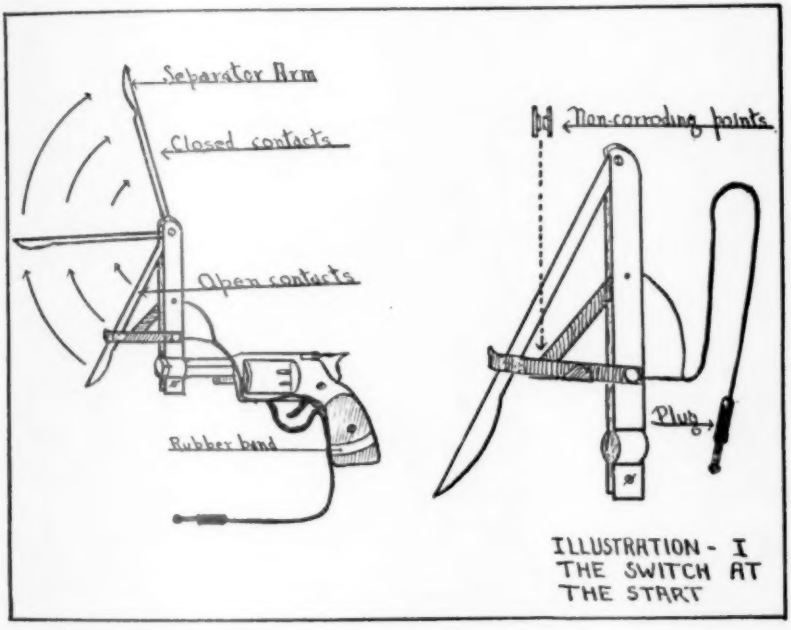

ILLUSTRATION - I
THE SWITCH AT
THE START

At the explosion of the cartridge only, is it actuated, which is desirable because the timer is not set into action until the runners are also set into action. This saves unnecessary manipulation of the switch and timer in case the shell is not exploded; some switches do not have this feature. Only in the case of "jumping the gun" is it necessary to reset the above, which is very simple and requires but a second or two.

Most switches are of the "make-and-break" type, but this switch when made stays made by the action of powerful steel springs. Non-corroding points warrant good contact. If it were possible to use the "make-and-break" switch with this timer, it would simplify matters more, but if a second contact should be made either accidentally or otherwise, the watch in the timer would be stopped before the race was completed and if a second contact should be made immediately

after the race, the watch might be reset before it could be read. The "make-and-freeze" switch now displaces the "make-and-break" type. Here certainty is assured that the necessary stimulus will be received at the timer which with the "make-and-break" switch was seldom ever possible, because the contacts were made and broken so rapidly that the stimulus was too faint when it reached the timer. After the contacts are closed at the gun, the starting circuit is automatically cut out by an automatic switch at the timer. In other words, the starting switch is used only to the extent that is necessary to give an effective stimulus, then is automatically cut out. This feature adds to the timer by making it more foolproof.

THE SWITCH AT THE FINISH

Features.—This switch is of special design and operates on the same "make-and-freeze" principle as the starting switch. It is quickly and easily attached to the side or top of the usual post at the finish where it can be plugged into the circuit. A pulley attachment with weight is put on the opposite side of the track and completes the switch equipment. The switch is constructed so that it may be operated from either side of the track.

Much trouble was experienced in developing a satisfactory switch as it was almost impossible to get one that was sensitive enough and yet not so sensitive that a slight jar or gust of wind would operate it.

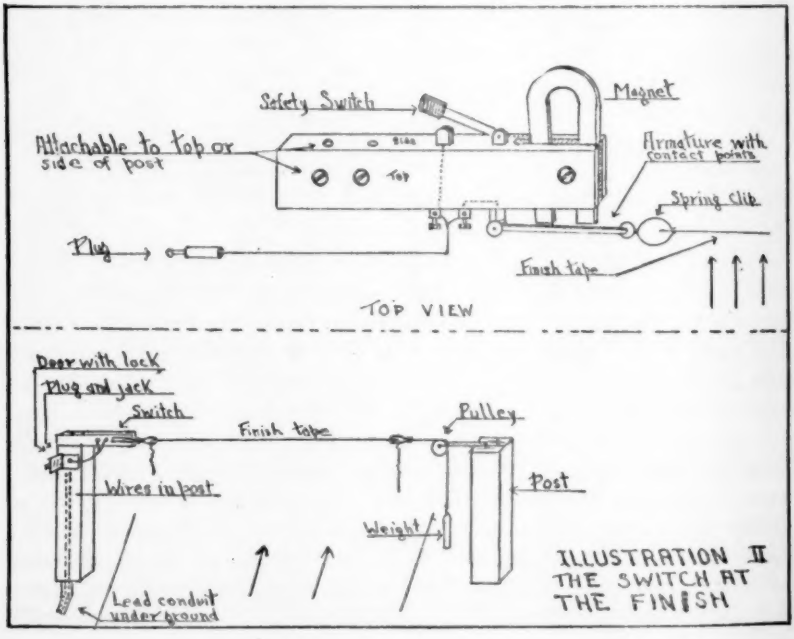

ILLUSTRATION II
THE SWITCH AT THE FINISH

It was like trying to cross a bridge without getting on the other side. Much of the same trouble developed here as at the start. A "make-and-break" was useless here also, for the same reasons as before stated. Then too, a second contact might reset the watch before it could be read. After trying all sorts of arrangements, the above switch proved to be the best solution to the problem.

To get the necessary "make-and-freeze" and yet to get the high degree of sensitiveness required, a permanent magnet was employed. The switch, as it now is, allows a standard tension to be placed upon the tape by a standard pulley weight and when this is done, a standard degree of sensitiveness is accomplished. A one-inch displacement of the tape is sure to operate it. The lag time due to this amount of distance can be compensated for by moving the switch and opposite pulley and weight ahead one inch, if that is desired. Really when it is figured out, the time lost in a 100-yard dash in 10 seconds over a distance of an inch amounts to approximately .0027 seconds. This is practically negligible and, as mentioned before, can be eliminated. To further assure a standard degree of sensitiveness, the gap between the magnet and the armature is standardized. Here again non-corroding contact points are used.

The *same* circuit is actuated at the timer as at the start, which compensates for any lag time lost at the start. If the lag time at the start is the same as that at the finish, the true time is then possible.

The switch is equipped with a safety switch to be used in such races as the 440-yard run, 880-yard run, etc., where the runners must go around the track once or more. The idea is to guard against possible contact when the tape must be strung while a race is on, during the last lap. After the tape is up and all set, the safety switch can be closed for the finish of the race.

The tape is held at both ends by spring clips which will let go when sufficient tension is put upon them, thus the same tape can be used repeatedly.

THE TIMER

Features.—This timer is compact and complete, fitting into a portable case 9″ x 11″ x 12.″ It is quite simple in construction, assuring low cost, compactness, dependability, and accuracy. It is quite simple to plug in and operate.

One of the main features of the device is a relay switch (E) that relays the starting and finish stimuli to the electro-magnet (D), which attracts the armature and lever arm (C), which in turn depresses hundreth second watch (K). Another feature is an automatic cut-out switch (B) which, when once depressed by closing contact points at the start, starts the watch and cuts out the starting circuit at terminal (1) and contacts terminal (2). This makes the finish circuit ready.

Then, when the arm is depressed the second time by closing contact points at the finish, the watch is stopped and the finish circuit at terminal (2) is cut out.

Resetting is accomplished by simply operating the knob (4) at (B), downward, to the left, and up, which makes ready the starting circuit. Before the device is reset, the test buzzer (A) should be tried first, to make sure that the contacts at the gun and finish tape are open,

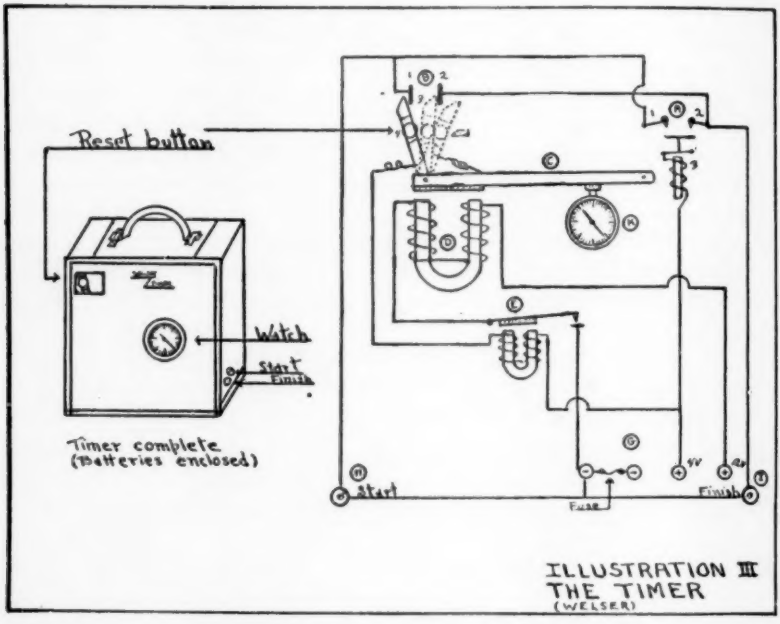

ILLUSTRATION III
THE TIMER
(WELSER)

otherwise the lever arm will not remain set. If pressing button (1) does not bring the buzzer (3) into action, the contacts at the gun are open and if pressing button (2) does not bring the buzzer into action, the contacts at the finish are open. After making sure that both contacts at start and finish are open, the watch can be reset for the next race.

These three features are plain and simple, however, offer many advantages, and help to make the timer more practical.

Arrangement on Track.—This is shown in the following illustration for a permanent set-up.

The above set-up could be installed either by a conduit underground, which is no doubt most desirable, or by overhead wiring. In either case the wires would terminate at either cement or wooden posts equipped with jacks into which the plugs of the starter's gun, the timer, and the finish switch could be plugged. Either arrangement could

be used, but the cement posts and the conduit would be more stable and offer less chance for trifling by individuals who might attempt shunting the circuits by the use of a knife blade, etc. The jacks on the post could be protected from the weather and triflers by a locked door.

A temporary arrangement could be made by connecting the apparatus as illustrated with the exception of stringing the wires upon the ground instead of putting them underground or overhead.

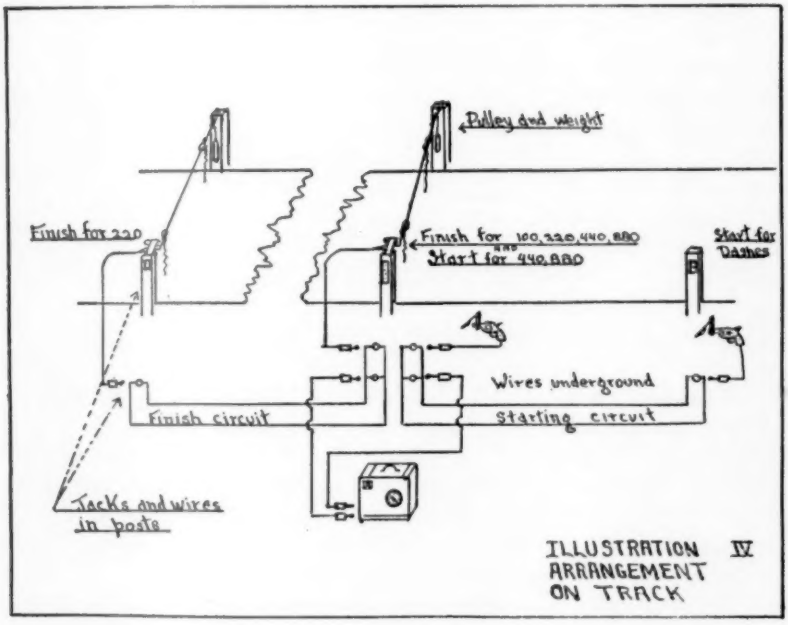

ILLUSTRATION IV
ARRANGEMENT ON TRACK

CALIBRATION

The instrument which was built from odds and ends was calibrated to determine the reaction time or lag time. This was done by using the kymograph and electrically vibrated tuning fork set-up. Both instruments were set into operation by simultaneous stimuli and the lag time of the timer was measurable by the number of vibrations between the reaction of both devices. A special switch was attached which was broken the instant the watch was started. This broke the circuit of the signal marker immediately after the circuit was made. The lapse between was the reaction time. The table on the next page gives a sample of the results.

From the smoked drum curves, it was found that the reaction time on an average was .029 seconds in the start circuit and .028 seconds in the finish circuit within the timer. These averages came within a

range of .02 to .04 seconds at the start and .02 to .03 seconds at the finish. The average difference between the lag time at the start and at the finish was .0008 seconds. This slight variation may have been due to the different resistances in the watch in starting and stopping. One might think that this lag time would be a large enough error to warrant skepticism, but this error is practically constant at the start as at the finish and there is then practically no error as they compensate for each other. To get a clearer picture, reference may be made again to the analytical illustration on page 98.

	Start Circuit	*Finish Circuit*	*Differences*
1.	.04 Seconds	.03 Seconds	.01 Seconds
2.	.03 Seconds	.03 Seconds	.00 Seconds
3.	.03 Seconds	.03 Seconds	.00 Seconds
4.	.02 Seconds	.03 Seconds	—.01 Seconds
5.	.03 Seconds	.03 Seconds	.00 Seconds
6.	.03 Seconds	.03 Seconds	.00 Seconds
7.	.02 Seconds	.02 Seconds	.00 Seconds
8.	.02 Seconds	.03 Seconds	—.01 Seconds
9.	.03 Seconds	.03 Seconds	.00 Seconds
10.	.04 Seconds	.03 Seconds	.01 Seconds
11.	.03 Seconds	.03 Seconds	.00 Seconds
12.	.03 Seconds	.02 Seconds	.01 Seconds
Average	.0291 Seconds	.0883 Seconds	.0008 Seconds

It might then be said that the reaction time was variable, in terms of the 100-yard dash in 10 seconds, a distance of *.288 inches*. These figures can be compared with those of the 64 timers mentioned by Professor Cureton and David Coe in their article "An Analysis of the Errors in Stop-Watch Timing," which shows these men having an average error of .333 seconds or again, in terms of the 100-yard dash in 10 seconds, a distance of *9.06 feet* approximately.

The timer then is highly accurate and the accuracy of the watch must be checked. This can be done by some competent jeweler who may be appointed by those having that capacity, namely the rules committee of the A.A.U. and other governing bodies. Up until recently most jewelers have been skeptical in certifying the accuracy of watches, but now with the aid of the latest instrument built by the Electrical Research Products, Incorporated, jewelers may check, adjust, and certify watches in a few minutes. Checking watches in the past when such equipment was unknown was a long and uncertain procedure. In the case of important events or in case of doubt, checking should be done before and after use.

The timer in its crude form was used and proved under several actual situations. Of chief importance was the National Indoor Championships for Women at Madison Square Garden last February 25. Here all of the 50-meter runs were timed, not only by Welser, but by Mr. Day of the Electrical Research Products, Incorporated, with the

"Kirby Two-Eyed Camera." Out of 18 races timed, Welser and Day ran remarkably close. Welser's deviation from the officials' (hand timers) was from a —.085 seconds to a +.15 seconds or a total range of .235 seconds with an average of ±.066 seconds. Day's deviation was —.11 seconds to a +.14 seconds or a total range of .25 seconds with an average of ±.062 seconds. Welser's average difference with Day was ±.049 seconds. The timer met with the verbal approval of those sponsoring the meet and much favorable comment resulted from its degree of practicability.

IV. CONCLUSIONS

It is now hoped that after such a brief and general discussion, the reader will become somewhat aware of the various methods of timing races and that he will appreciate some of the problems involved. The main object of this paper is to relate in a very brief way some things that have been accomplished and to put before those interested a seemingly practical way of timing race events. The author believes the practical way is one that is simple, foolproof, accurate, compact, low-priced, and portable. It is believed that the above method so far excels in these items and should meet favor in average use in high schools and colleges or wherever race events are popular. At present the described timer is in the hands of a manufacturer for refinement, and timers will soon be ready for use.

Physical Education a Determining Factor in the Control of the Weight of the College Girl

By Margaret McCall
Director of Physical Education, Baylor College, Belton, Texas

DURING the past few years, and especially during the last year, the value of physical education and other so-called "special subjects" has been questioned. Just at the time when our national government is advocating a six-hour working day and thereby increasing leisure time for the masses, there is a movement on foot, based on the plea of economy, to question the actual value of physical education and to curtail its program accordingly. To the thinking individual this point needs no discussion; but for those who are likely to be misled by this propaganda, the value of physical education should be pointed out.

Health is one of the outstanding values to be sought and weight is one of the most important factors in good health. With this in mind, a study was made of 173 freshman girls at Baylor College to determine the relationship between gains and losses in weights of students who take physical education and those who do not. The study was made over a period of nine months from September 15 to May 15.

All the students in Baylor College are not required to take physical education; thus it was possible to have a control group for this study. Girls who work three hours or more a day to defray a part of their college expenses are excused from physical education. There were 173 students included in this study. Of this number 102 were enrolled in at least one specified course in physical education and the remaining 71 were not taking physical education during the nine months. The living conditions of all students, aside from the physical education factor, were practically the same.

The specified course for all freshman girls consisted of twelve weeks of volleyball and hockey, twelve weeks of formal gymnastics and games, and twelve weeks of baseball and games of low organization. The girls who were working and who were not taking physical education were doing either secretarial work or household duty.

The Baldwin-Wood standard height-weight tables were used to determine standard heights and weights, and these data were collected under the same conditions on May 15 as on September 15. Chrono-

logical ages were found and standard weights computed according to the height and age of students on each date. However, it is to be remembered that a variation from this table does not necessarily mean that the individual was over or below normal weight.

According to a discussion by Wood and Rowell, "underweight" may mean any weight which is less than the table figure; but it is not synonymous with malnutrition. "Several new terms are proposed to describe conditions previously given various names, which have been used incorrectly or vaguely: 1. 'Normal range' or 'health weight' is a range of weight between under-health-weight and over-health-weight. 2. 'Under-health-weight' is to mean weight which is at least 7 per cent or 10 per cent below the standard table weight. Since authorities differ as to the borderline at which 'under-health-weight' begins, this borderline is given at either 7 per cent or 10 per cent below the standard weight. The authors believe that the actual borderline is somewhere between 7 and 10 per cent but that neither is the true figure. In addition to being below the borderline, 'under-health-weight' is to be considered to be such a state of under-table-weight in an individual who shows signs of malnutrition or other health defects."[1] Thus, it should be borne in mind in this study that, although a large number were below standard weight, it does not mean they were "under-health-weight."

According to the Baldwin-Wood table 65 per cent of the girls taking physical education were under standard weight on September 15, whereas only 51 per cent were under standard weight on May 15. In the group not taking physical education 61 per cent were under standard weight on September 15, and 41 per cent on May 15. Therefore, the percentage of underweights in the group taking physical education was reduced 14 per cent and the percentage in the group not taking physical education was reduced 20 per cent. However, 79 per cent of the under-standard-weight group taking physical education did gain and only 67 per cent of the group not taking physical education gained.

It was interesting to note that the percentage of each group which was overweight increased during the nine months. In the group taking physical education 25 per cent were over the standard weight in September and 28 per cent were over the standard weight in May. In the group not taking physical education 32 per cent were over standard weight in September as compared with 49 per cent in May. Thus, the percentage overweight increased 17 per cent in the group not taking it as compared with only 3 per cent in the group taking it.

Five per cent of the group taking physical education were of standard weight on September 15 as compared with 10 per cent on May 15. Seven per cent of the group not taking physical education were of standard weight on September 15 and only 10 per cent on May 15. Thus,

[1] T. D. Wood and H. G. Rowell. *Health Supervision and Medical Inspection of Schools*, pp. 88. Philadelphia: W. B. Saunders Company, 1928.

the percentage was increased 5 per cent in the group taking as compared with only 3 per cent in the group not taking physical education.

A comparison was also made of the average gain of those girls who increased in weight. The average gain was eight pounds in each case. The average number of pounds lost by those who decreased in weight was five pounds for those taking physical education, and three and one-half pounds for those not taking.

TABLE I

A Comparison of the Weight Control of Physical Education and Non-physical Education Students

	Taking Phys. Ed.		Not Taking Phys. Ed.	
	Sept.	May	Sept.	May
Number under standard weight	66	52	43	29
Per cent under standard weight	65%	51%	61%	41%
Per cent under standard weight who gained		79%		67%
Number over standard weight	27	29	23	35
Per cent over standard weight	25%	28%	32%	49%
Increase in percentage over standard weight		3%		17%
Number standard weight	5	10	5	7
Per cent standard weight	5%	10%	7%	10%
Increase in percentage		5%		3%

The most marked contrast in the two groups was the increase in the percentage of the number overweight. There was an increase of 17 per cent in the group not taking physical education as compared with 3 per cent in the group taking physical education.

Thus, there are three main points brought out in this study:

1. The percentage of students gaining who were under standard weight on September 15 was greater among students who took physical education than among those who did not. Of the group taking physical education 79 per cent of the students under standard weight increased in weight, as compared with 67 per cent of the group not taking physical education.

2. The increase in the per cent over standard weight was greater among students not taking physical education. There was a 17 per cent increase among students not taking as compared with 3 per cent among students taking physical education.

3. The increase in percentage of students who were of standard weight was greater among those taking physical education than those not taking. The increase was 5 per cent in the group taking physical education as compared with 3 per cent in the other group.

This study would indicate that physical education is one of the determining factors in the control of weight of the college girl. Further studies over a longer period of time should be made, but this one study goes to prove one of the many values of physical education and to justify its place in the college curriculum.

A Rating Scale for the Selection of Athletic Managers

By C. L. Nordly,
Graduate Student, Teachers College,
Columbia University

THE PROBLEM

THE EFFORT has been made to devise a rating scale which will facilitate a fairer selection of athletic managers (including intramural, interscholastic, and intercollegiate) than can be accomplished by purely subjective judgment.

Rating scales are not generally employed in the selection of athletic managers. At Amherst College*[1] the football, baseball, and track managers are selected by the Student Council on the basis of the manager's report of each competitor's work, scholastic standing, character, and personality. The manager's report considers the competitor's work as follows: accuracy and neatness, 10 per cent; letters, 15 per cent; personality, 15 per cent; efficiency, 30 per cent; initiative and interest, 30 per cent. At the University of Southern California[2] the General Athletic Committee appoints the assistant athletic managers on the basis of their ratings as intramural managers. The ratings are based on such items as written and oral examinations, scholarship records, psychological tests, and reports of the general manager, director of athletics, coaches, and student athletic managers.

METHOD OF PROCEDURE

Types of managerial organizations and the methods of selecting managers were determined by a survey of college and university handbooks and interviews with seven coaches in Minnesota colleges and high schools. The accumulated data seems to indicate that manager corps generally consist of freshman or sophomore tryouts or novices, junior assistant managers, and senior managers. One or more of the tryouts are usually selected as assistant managers providing their work has been satisfactory. If there is only one assistant manager, he is usually appointed as manager the following year. If there are two or more assistant managers for a particular sport or season, one of them is frequently selected as manager for the ensuing year. Occasionally an alternate manager is appointed. Assistant managers and managers are generally appointed by

* Numbers refer to bibliography at end of article.

a committee consisting of two or more of the following: coach, director of athletics, director of intramurals, director of physical education, retiring manager, and retiring assistant manager.

A study of the duties of athletic managers was made in order to determine those qualifications which are believed to be essential for an efficient athletic manager. Numerous textbooks on the theory of coaching different sports were consulted. There is a scarcity of published material on the duties of athletic managers. G. S. Veenker[3] has listed the duties of basketball managers in his book, *Basketball for Players and Coaches. Athletics in Education* by J. F. Williams and W. L. Hughes[4] was another source of information. Many general duties of intramural and intercollegiate athletic managers are listed in college and university handbooks.

Additional duties were compiled by the writer as the result of his experience as a coach. The duties of football, basketball, baseball, and track managers were compiled. Space does not permit the enumeration of them. The general duties (making reports, checking eligibility, etc.) of intramural managers for each sport or season are practically the same. The specific duties, e.g., attention to equipment, etc., for the conduct of the intramural sports, are very similar to those for the conduct of freshman or varsity sports. The general duties of freshman or varsity sports managers, e.g., checking attendance, can be applied to every sport.

The items for the scale were selected and defined after a study of the duties. They were revised following a classroom discussion[5] and later submitted to twenty men with coaching experience for the purpose of determining the relative importance of the various items. The experienced coaches were requested to rate the items from one to ten on the basis of their being important for student athletic managers; to consider *ten* as absolutely essential and *one* as being of little value; to cross out items which they considered of no value; and to add items which they believed should be included. All of the items were considered of some value and no additional items were suggested.

TABULATION OF THE COACHES' RATINGS OF THE ITEMS

Items	1	2	3	4	5	6	7	8	9	10	Mean
1. Ability to organize				1			1	2	4	12	9.2
2. Ability to deputize				1			1	3	5	10	9.
3. Ability to supervise					1	1	2	5	4	7	8.6
4. Initiative					1			4	5	10	9.1
5. Attendance					2		1	4	7	6	8.6
6. Relation to co-workers						1	1	13	1	4	8.3
7. Care of equipment		1			1	1	1	3	4	9	8.5
8. Ability to make reports				2	4		1	9	3	1	7.2
9. Disposition		1				3	7	3	3	3	7.5
10. Character	1				1	1	6	3	2	6	7.9
11. Ability to meet people					1	3	1	4	4	7	8.4
12. Knowledge of duties	1		2	1	2	3	2	3	2	4	6.8
13. Scholarship	2		3	1	5		6	1		2	5.5

ATHLETIC MANAGER RATING SCALE

Rating of.....for .....
by.....date .....

Rate all individuals from 1 to 5 on the first eleven items.
Rate all individuals on a single item at a time.
Values of 5, 3, and 1 are defined below each item.
Write your ratings in the R spaces and multiply your ratings by the figure in the M spaces. Write the result in the S spaces which are provided for the score for each item.

1. Ability to organize: to get into working order.

R	M	S
	9.2	

(5)
Organization functions systematically; intelligently plans for effective integration of managers.

(3)
Organization functions fairly well; some planning for effective integration of managers.

(1)
Organization functions poorly; very little planning for effective integration of managers.

2. Ability to deputize: to assign, to appoint, or delegate to a task.

	9.0	

(5)
Subordinates' duties well distributed; subordinates understand duties; methods approved, e.g., does not assume a superior attitude.

(3)
Subordinates' duties fairly well distributed; occasional misunderstanding of duties; methods generally approved, e.g., only occasionally assumes a superior attitude.

(1)
Subordinates' duties very unequally distributed; frequent misunderstanding of duties; methods not approved, e.g., usually assumes a superior attitude.

3. Ability to supervise: to inspect with authority, to guide and direct.

	8.6	

(5)
Readily sees and corrects weaknesses of subordinates; subordinates eager to respond.

(3)
Occasionally sees and corrects weaknesses of subordinates; subordinates' responses are fair.

(1)
Rarely sees and corrects weaknesses of subordinates; subordinates are slow to respond.

4. Initiative: ability to apply one's self to tasks without direction.

	9.1	

(5)
Volunteers frequently.
does more than his own duties;
frequently sees and does tasks without direction.

(3)
Volunteers occasionally;
usually does more than his own duties;
occasionally sees and does tasks without direction.

(1)
Volunteers seldom;
not eager to do more than his own duties;
seldom sees and does tasks without direction.

5. Attendance: consider ability to serve without tardiness or absence.

R	M	S
	8.6	

(5)
Never absent or tardy at meetings, for duties, or with reports.

(3)
Absent or tardy 4 times at meetings, for duties, or with reports.

(1)
Absent or tardy 8 times at meetings, for duties, or with reports.

6. Relation to co-workers:

	8.3	

(5)
Excellent cooperation;
welcomes suggestions and profits from them.

(3)
Fair cooperation;
profits by some suggestions.

(1)
Usually unwilling to cooperate;
seldom profits by suggestions.

7. Care of equipment:

	8.5	

(5)
No equipment lost;
equipment always on hand;
balls always properly inflated.

(3)
Some equipment lost;
equipment usually on hand;
balls usually properly inflated.

(1)
Much equipment lost;
all of equipment seldom on hand;
balls frequently soft.

8. Ability to make reports:

	7.2	

(5)
Always accurate;
unusually neat;
easily read.

(3)
Some errors;
some erasing;
read without much difficulty.

(1)
Very inaccurate;
much erasing;
read with difficulty.

9. Disposition: steadiness of a cheerful and optimistic temperament.

	7.5	

(5)
Always cheerful and optimistic;
enlivens the group by his presence.

(3)
Usually cheerful and optimistic;
usually enlivens the group by his presence.

(1)
Uncheerful and pessimistic;
seldom enlivens the group by his presence.

10. Character: your impression of the individual with reference to natural and acquired traits.

R	M	S
	7.9	

(5)
Always honest;
always courteous;
always loyal.

(3)
usually honest;
usually courteous;
usually loyal.

(1)
Frequently dishonest;
frequently discourteous;
frequently disloyal.

11. Ability to meet people:

	8.4	

(5)
Makes an excellent impression.

(3)
Makes a fair impression.

(1)
Makes a poor impression.

The next two items are to be rated by the director or coach.

12. Knowledge of duties: consider relative standing of the individual in the group in an examination (highest possible score of 100) on sport rules, duties, training rules, and eligibility rules of the institution.
Divide the score on the test by 20 to obtain the rating.

	6.8	

13. Scholarship: scholastic record or achievement in the classroom.
Rating equals ½ "score" as determined by the table for the transmutation of an order of merit into scores. (See table page 116.)

	5.5	

Total Score
Final Rank

INSTRUCTIONS FOR THE USE OF THE SCALE

The mean rating for each item as indicated in the tabulation of the results of the coaches' ratings of the items represents the multiplier (*M*) for each item. For example, if an individual has been rated 3 in initiative, his score is 3 times 9.1 or 27.3 for the item since 9.1 was found to be the mean rating for that particular item by the coaches' ratings. The scores for all of the items are added to give the total score.

It is recommended that three persons rate each competitor.[7] The average total score would then be the score which is used in ranking the prospective candidates. Those who do the rating should be interested in the procedure and should have had the opportunity to observe the work

(To be Used for Item 13.)

TABLE FOR THE TRANSMUTATION OF AN ORDER OF MERIT INTO UNITS OF AMOUNT OR "SCORES"[6]

Per cent	Score	Per cent	Score	Per cent	Score
.09	9.9	22.32	6.5	83.31	3.1
.20	9.8	23.88	6.4	84.56	3.0
.32	9.7	25.48	6.3	85.75	2.9
.45	9.6	27.15	6.2	86.89	2.8
.61	9.5	28.86	6.1	87.96	2.7
.78	9.4	30.61	6.0	88.97	2.6
.97	9.3	32.42	5.9	89.94	2.5
1.18	9.2	34.25	5.8	90.83	2.4
1.42	9.1	36.15	5.7	91.67	2.3
1.68	9.0	38.06	5.6	92.45	2.2
1.96	8.9	40.01	5.5	93.19	2.1
2.28	8.8	41.97	5.4	93.86	2.0
2.63	8.7	43.97	5.3	94.49	1.9
3.01	8.6	45.97	5.2	95.08	1.8
3.43	8.5	47.98	5.1	95.62	1.7
3.89	8.4	50.00	5.0	96.11	1.6
4.38	8.3	52.02	4.9	96.57	1.5
4.92	8.2	54.03	4.8	96.99	1.4
5.51	8.1	56.03	4.7	97.37	1.3
6.14	8.0	58.03	4.6	97.72	1.2
6.81	7.9	59.99	4.5	98.04	1.1
7.55	7.8	61.94	4.4	98.32	1.0
8.33	7.7	63.85	4.3	98.58	.9
9.17	7.6	65.75	4.2	98.82	.8
10.06	7.5	67.48	4.1	99.03	.7
11.03	7.4	69.39	4.0	99.22	.6
12.04	7.3	71.14	3.9	99.39	.5
13.11	7.2	72.85	3.8	99.55	.4
14.25	7.1	74.52	3.7	99.68	.3
15.44	7.0	76.12	3.6	99.80	.2
16.69	6.9	77.68	3.5	99.91	.1
18.01	6.8	79.17	3.4	100.00	.0
19.39	6.7	80.61	3.3		
20.93	6.6	81.99	3.2		

Example.—Five competitors have scholastic standings of B+, B, C+, C, and C—. The per cent position for the competitor with the C standing (fourth in rank in Order of Merit) is found by substituting in the formula $\frac{100\ (R - .5)}{N}$ in which R represents the rank in the Order of Merit and N the number ranked. Then $\frac{100\ (4 - .5)}{5} = 70$. The "score" obtained from the per cent position is 4.0 (70 — 69.39 is less than 71.14 — 70). The competitor's rating equals $\frac{4.0}{2}$ or 2 which multiplied by 5.5 equals 11, the competitor's score on the scale.

of the competitors. The writer believes the coach, captain, and manager of the sport of managerial competition should do the rating of inter-scholastic or intercollegiate managers. For the selection of intramural managers the director of intramurals, the director of physical education, and the manager of intramurals should be qualified to rate providing they have had the opportunity to notice the performance of the com-

petitors. It would be better to have only one individual rate if others have not been in close contact with the managerial corps.

It is further recommended that there should be a meeting of the raters during the first week of the academic year to train the raters for the fall sport season. Those who are to rate managers for winter and spring sports should have meetings previous to their sport seasons. Occasional conferences throughout each season will assist in pointing out individual faults, discussing cases, and clearing up contradictions.[8]

Raters should be instructed to observe the prospective managers in service and to write down their observations.[9] However, generalizations should not be made upon one instance. A first impression should be checked by several observations.

Raters should be further instructed to free themselves from any bias toward the individuals being rated. They should be warned against permitting their total feeling toward a competitor to influence their rating of the individual items. Each item should be carefully considered and the rating made upon the basis of what the competitor actually does in the performance of his duties.

CONCLUSION

The validity of the scale which has been devised must be proved. Obviously, the claim cannot be made that a rating scale for the selection of athletic managers has been perfected. However, it is hoped that the scale will overcome certain deficiencies in former practices and provide a fairer means of selection of managers.

The writer believes that a thorough understanding of the duties of athletic managers in addition to the items of the scale will increase the efficiency of administrators and members of managerial corps.

There is a need for more published material on the duties of interscholastic, intercollegiate, and intramural sports managers.

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BOOK REVIEWS

HIGH SCHOOL CURRICULUM REORGANIZATION. (North Central Association of Colleges and Secondary Schools, 1933) 395 pages.

This volume represents the work of the North Central Association's Committee on Standards for Use in the Reorganization of Secondary School Curricula.

The chief task was to formulate a statement of the ultimate and immediate objectives of secondary education, and then discover procedures by which these objectives might be applied to the selection of subject matter.

Since a committee on curricula has existed for several years, its personnel has been changed from time to time. Therefore the final editing committee under the chairmanship of Dr. L. W. Webb of Northwestern University had no easy task in organizing and publishing the material gathered by numerous subcommittees. When one considers the untold past accretions to our high school curricula which represents vested interests of "textbook makers, teachers, trainers, or theory builders," the tremendous task of evaluating, rejecting, and replacing means an ever-changing and unpredictable new curriculum.

The committee wisely set up ultimate objectives such as health, leisure, social relationships, and vocational activities. These they analyzed carefully. Their attention was then turned to the immediate objectives in terms of pupil acquisition and development. These dealt with means of acquiring knowledge, developing interest, motives, etc., developing mental techniques, right habits, and useful skills.

Emphasis was upon the qualitative element throughout. The "What should go into a curriculum?" was considered before the "How much should go into it?"

With a rather clear pattern of objectives as a directing device each subject field committee made its suggested revision; and these revisions form the bulk of the volume. A rather comprehensive bibliography accompanies each chapter. The areas giving reorganized curricula as chapters are art, music, English, Latin, French, Spanish, German, general science, biology, chemistry, physics, mathematics, social studies, home economics, health and physical education, and extra-curricular activities.

The subcommittee on health and physical education carefully avoided the use of illustrative material, feeling that its chief concern should be with a point of view. However, inasmuch as the efforts of the general committee were directed toward the revision of high school subjects along socially functional lines, the subcommittee on health and physical education might have been a bit more specific in illustrating in part how its activities aim to accomplish this function.

Although the volume represents some of the best thinking on secondary school curricula, it was not intended to be the last word. Some of the materials and methods already seem antiquated. From this standpoint it will be both a good measuring rod for evaluating present practices and objectives, and a landmark for future departures—for *venture we must* into the arts of living and methods of inducing adolescents to participate therein.

CHARLES C. COWELL
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STUDENTS' HANDBOOK OF ARCHERY. Phillip Rounsevelle. (A. S. Barnes & Company, 1932) 34 pages, 30 individual score sheets, 26 illus. 25 cents.

The set-up of the book meets the requirements of a students' handbook in size, form, and price.

The chapters cover: (1) instructions to the beginner; (2) essentials of shooting including analysis of common faults when the arrows are going high, low, right, or left; four of the most general causes of injury with the remedy for each, and an explanation of grouping and scoring; (3) care of equipment; (4) archery games with their shooting rules, and a list of the standard rounds; and (5) reference material.

The illustrations are well adapted to student use. In many, both the correct and incorrect forms are shown, which makes the descriptive material clear.

Assignments made in this book save much time in class discussion thereby offering maximum time for shooting. The handbook will also serve as a ready reference for future check on one's own archery form. It is a companion to *Archery Simplified* written by the same author.

EMMA L. WILDER
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GAME PREFERENCES OF 10,000 FOURTH-GRADE CHILDREN. Norma Schwendener. (Columbia University Press, 1932) 64 pages. $1.10.

This scientific piece of research comes as a recent pioneer work inquiring into the game preferences of a specific grade group. It came to be one concerning fourth-grade children for three very pertinent reasons:

(1) As a group their games have been inadequately studied.

(2) Among makers of game curricula there is much disagreement concerning material for this grade.

(3) There is, in current courses of study for this group, a large amount of repetition of games which have been taught in the first three grades, with no consideration for increase in skill or growth in the activity.

The conditions for this study took into account several popular opinions concerning game choices, namely:

(1) That boys and girls of the fourth grade should have and desire different types of games.

(2) That the seasons of the year greatly affect choice of games.

(3) That geographical location or climate is very influential in determining the games chosen.

Therefore, data were made available by the following public school systems: Springfield, Massachussetts; Toledo, Ohio; and Houston, Texas, which provided the February data; Detroit and Kalamazoo, Michigan, and Tampa, Florida, which gave data in April. In answer to the questionnaire used, each child named (1) his first, second, and third choice games; (2) all other games remembered; and (3) his favorite playground game.

From the tabulation and analysis of these games, a number of important conclusions were drawn:

(1) Because of the lack of sex differences in game choices the game curricula for fourth-grade boys and girls should be identical.

(2) Neither climate nor season alone need cause a differentiation of games.

(3) A successful program of games depends upon the selection and use of a few games. Each of these games must contain the elements found to be pleasing and satisfying to fourth-grade children, by virtue of their presence in each of the preferred games.

These elements are:

a. General bodily activity plus certain specific bodily activities.

b. Strenuous and general participation.

c. Competitive behavior.

d. Social organization of the two-group type.

It is recommended that the above conclusions be considered in the making and revising of game curricula for fourth-grade children and that a similar technique of study be applied to research in other phases of the physical education program.

The book gives in five chapters a well-

organized and detailed account of this study. The appendix of the list of games named by these 10,000 children, and the recommended game list resulting from this study should be interesting and of use to all teachers of games. The whole work should prove to be an inspiration and a help to those teachers and supervisors interested in the study and revision of game curricula offered in their courses of physical education.

EVELYN VAN VACTOR
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THEORIE DER GYMNASTIC, Carl Diem. (Weidmannsche Buchhandlung, Berlin, 1930.) 296 pages.

Dr. Carl Diem is General Secretary of the Deutsche Hochschule für Leibesübungen and is well informed of the status of physical education in various countries. He has visited America several times. One of these visits gave rise to his *Sport in Amerika* which contains a thorough and broad survey of physical education as practiced in many of our prominent universities and in the schools of larger cities.

This present book is the fourteenth volume in a series of *Handbooks of Bodily Exercises* by Mallovitz, Neuendorff, and Diem, the publication of which is sponsored by the Deutsche Hochschule für Leibesübungen. There is an introduction and three main parts to this book, the first part covering the historical development of gymnastics; the second, the nature of gymnastics; and the third, the applications of gymnastics.

In the introduction he explains that the theory of gymnastics cannot be considered except in relation to bodily exercise in general. He would have the reader compare his own theory with the *Theory of Gymnastics* as presented by Diem. He would have the reader criticize and not merely absorb and accept Diem's observations. By means of this book he expects to place the instructor in a position enabling him to survey the entire field of physical education and its theoretical problems, effects, and interrelations so that he may draw satisfactory conclusions without omitting significant facts as is so frequently done by those who swear by a one and only truth.

Many interesting facts are brought out in the historical development, some of which come from the Greeks with whom Diem begins his first part. He takes up in turn the great reformers following the Renaissance and leading to the last century. This is followed by a description of the modern trends of physical education, in which he confines himself principally to the European innovators. The trends are divided into the physiological, the technical, the esthetic, and the artistic-philosophical. The various individuals who have fostered these trends are discussed.

In the second part he deals with the nature of the activities, devoting considerable attention to the modern rhythmic gymnastics and its disciples. Every activity is discussed as to its nature, purpose, and limitations, covering everything used in physical education and followed as sports. This part concludes with a brief discussion of gymnastics as a substitute and as an auxiliary means for what he calls life-forms of activities. It is a substitute in cases where there:

1. Is lack of space; for instance, no athletic field, no large gymnasium or other space essential for actual life-forms of bodily activities.

2. Is lack of time for the pursuit of, or preparation for, sport activities; or when time is lacking to get to the athletic field, or to other places, etc.

3. Is lack of apparatus and equipment, when equipment for games, for rowing, swimming, etc. are missing.

4. Are certain physical conditions, such as presence of defects and lack of strength, preventing the pursuit of vigorous sport activities.

Gymnastics is an auxiliary means inasmuch as it prepares for the sport activities and thus saves time, and also because it prepares the body by polishing

certain movements which are important in the pursuit of sport activities.

In the third part, Diem systematizes the work according to different points of view and sets forth the viewpoints of some of the leaders.

The book has many interesting surprises. It shows that some of the present trends in physical education are merely repetitions of past experiences, even some of the exercises practiced today in tumbling, individual and couple work, are merely repetitions of old practices. His opinions on rhythmic gymnastics are sane and realistic and have nothing of the metaphysical speculation about them. The book is profusely illustrated, has a complete bibliography, a rather full table of contents, but no index. I do not hesitate to recommend it to teachers of physical education who read German.

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WINNING BASKETBALL. Nat Holman. (Charles Scribner's Sons, 1932.) 215 pages. $2.00.

This book is primarily of interest to the young player who has had some experience in basketball, and to the coach of basketball teams. The long experience of the author in playing professional basketball, a large share of it with the original Celtic teams, and his successful coaching career have given him a thorough knowledge of the game from both the players' and coaches' viewpoint.

In this book he has treated basketball from the players' side and then from the coaches'.

The first two chapters deal with fundamentals and individual offense in a very thorough and helpful style. Much stress is placed upon the value of knowing the fundamentals thoroughly before building team play. The next two chapters are devoted to team offense, one with the five-man style and the other with the pivot style. An analysis of each type of offense is made, pointing out the strong and weak points with possibilities of each. Stress is laid upon fitting the play to the type of player, rather than the players to a type of offense. Many diagrams and some illustrations are given relative to these types of offense.

The next three chapters deal with the defense. The man-to-man and zone are carefully explained and illustrated. Included in the chapters on defense is one on switching, which is explained clearly and practically.

The coaching system used by the author is described fully from these angles: (1) physical condition of the squad; (2) perfecting the squad in fundamental details; and (3) developing the proper morale and spirit of cooperation. Some very helpful suggestions on handling a team are brought forth in this chapter.

The drills—which are shown in diagrams—are for developing the fundamental skills, but are done in a pleasing and useful manner. All the drills used are game skills organized in a situation as near to the actual game as possible.

The chapter devoted to the coach and the game explains the coach's duties (1) before the game, (2) during the warm-up period, (3) on the bench, (4) between the halves, and (5) after the game. The chapter devoted to problems and answers is very interesting and helpful.

The final chapter is devoted to the explanation of a good many plays, illustrated by diagrams. The feature part of this phase of the game is the fact that in each case the execution of the play is first described and then is followed by the defense for the same play.

This book covers the game of basketball in a very interesting and detailed manner. The player with experience and particularly the coach of either a high school or college team will find this treatise on basketball very stimulating and helpful.

FREDERICK W. EAST, JR.
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A TEXTBOOK OF ANATOMY AND PHYSIOLOGY. Jesse Feiring Williams, M.D. (W. B. Saunders Co., 1932) Fourth edition. 600 pages. 416 illustrations. $2.75.

The subjects of anatomy and physiology are apt to appear difficult to the student of these subjects outside of the medical school. In the first place, such students often lack the opportunity to see dissections of human or animal bodies. And, secondly, the new vocabulary is difficult to remember unless some provision is made for its use. The recent revision of Williams' *Anatomy and Physiology* has recognized these problems and has done much to solve them by increasing the number of photographs, charts, and diagrams, and by listing at the end of each chapter definite practical exercises which will give the non-medical student an opportunity to make use of his newly acquired vocabulary and his newly acquired knowledge. These features make this book an admirable text for students in physical education as well as students in nursing and other practical arts requiring an understanding of the structure and function of the human body.

The student's interest in human physiology is increased as he learns of the origin of various parts of the body. The elementary facts of embryology are presented in this book in such a way as to gain this increased interest. This broad approach should lead the student to a more comprehensive viewpoint.

The clear type, well arranged pages, numerous illustrations, clear descriptions, logical development, and practical teaching helps will all contribute to give this text continued popularity.

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TRACK AND FIELD. Charles W. Paddock. (A. S. Barnes & Co., 1933) 266 pages, $2.50.

Any book written over the name of the great athlete, Charles W. Paddock, is worthy of the attention of everyone interested in the fields of sports. The first chapter in the book deals with the origin of the Olympic Games, the modern Olympic Games, and sports in other lands as well as in the United States. A short description of the metric system is a timely inclusion as it is being more and more adopted as a system of measure.

Paddock's approach to the discussion of track and field events is a novel one since he considers them under four headings, viz.: (1) *speed*, (2) *stamina*, (3) *strength*, (4) *spring*. Under the *speed* events are included the 100-yard, 220-yard, 440-yard, and 880-yard dashes; the high, low, and intermediate hurdles; and relay racing. The distance runs are classed as events of *stamina*. Under *strength*, the shot put, the discus throw, the javelin throw, the hammer throw, and the 56-pound weight throw are discussed. In the *spring* events, the running high jump, the running broad jump, the hop-step-and-jump, and the pole vault are placed. In addition, a chapter is added on indoor events which includes the sprints, distance running, the walking events, odd-distance runs, the steeplechase, and the field events.

The appendix presents outstanding achievements in the middle distances, the distances, and the hurdles; outstanding field achievements in the jumps, the weights, the javelin, and the pole vault.

There is also included a discussion of all-round champions, and general training suggestions.

In the summary are found rosters of Olympic Track and Field Champions, Olympic Track and Field Records, 1932 Olympic Champions, Official World's Track and Field Records, American Championship Track and Field Records, and records for non-standard events. Blank space is provided for "Your School and College Records," "New World's Records," and "Notes." There is a bibliography which contains approximately sixty references to works on physical education and athletics.

In his discussion of each event Paddock goes into some detail regarding technique, qualifications, diets, and training schedules. Out of his wide ex-

perience as an athlete and a writer he has presented to his readers a clear and vivid picture of the proper technique of this sport. The book is recommended to all those who are interested in proficiency in the various track and field events.

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FOUNDATIONS OF HEALTH. Josephine L. Rathbone, Francis L. Bacon, and Charles H. Keene. (Houghton Mifflin Co., 1932) 415 pages. $1.56.

There are relatively few textbooks in health education suitable for use in the senior high schools. There are many physiologies and hygiene texts, some of which have a health viewpoint, but this book presents a welcome and needed addition.

Our elementary schools focus attention on habit formation with information to rationalize these habits according to the grade level of the children. While habit formation is still legitimately a part of high school health, the problem is different. Information gained in any grade should be scientifically sound. In the high school, information assumes a much more important rôle, since this knowledge tends to bolster the health habits more as the child grows older.

The book is divided in two parts, and is based on the unit plan. Such units as the meaning of health, human adjustments, nutritional needs of the body, circulation of the blood, represent the more usual type of units covered in high school texts. The physical examination, following up the examination, and maintaining good health are the newer types of units. Each chapter includes discussion questions, problems and projects, and a bibliography for teacher and child. In most chapters the discussion questions and problems are listed after each section. The illustrations are numerous, interesting, and to the point. The book includes a wide range of subject matter. For this reason, the treatment must of necessity be brief. The subject matter is decidedly positive. There is a good glossary and index—two factors which add to the teaching value of the book.

Mental hygiene receives emphasis throughout the book—not in chapters so labeled but in the viewpoint that is consistent. One wonders why there is no mention of sex in a book that is as frank as this book.

Foundations of Health sets a high standard for high school texts.

MARY MAY WYMAN
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A HEALTH INSTRUCTION GUIDE FOR ELEMENTARY SCHOOL TEACHERS. Jeanie Pinckney, Alice H. Miller, and Nancy H. Pettus. (Bureau of Nutrition and Health Education, Division of Extension, The University of Texas, 1932) 368 pages.

The Texas course of study in health education is undoubtedly one of the best courses of study in health education that has been written. It is the outcome of the school health program in two Texas towns.

The table of contents lists five parts to this book; there are, however, three main divisions: several chapters that define a health education philosophy and some suggested methods; the grade placement of health activities with objectives and outcomes; and a list of references. The references list materials by grades, and give a list of source books by topics.

Parts I and II contain information that is valuable in orienting the teacher to the problem of health education. Of particular significance in Part II is the discussion, "Place and Relation of Health Instruction in the Elementary School Curriculum." The authors recommend (for Texas) "a definite period set aside for hygiene teaching and the adopted health text and follow as nearly as possible a procedure that would lead to integration." The necessity for this procedure is not confined to Texas, but too often school officials will not look necessity in the face and efforts in health education are left entirely to correlation with other subjects.

Sources of health objectives is particularly interesting because of the large

amount of original data included in the material. All sources of objectives are discussed and possible utilizations are shown. The list of specific health objectives is so arranged that the teacher can use it for a check list. "Methods Useful in Health Instruction" is the title of Part III. This material is well chosen and helpful to the teachers. References for additional reading are given under each part. These references are well chosen.

The spiral plan is used in the grade placement of health activities. The same problems are presented for each grade in relation to the changing needs and interests of the child. All work is outlined in terms of "Activities, Objectives, and Outcomes." These three factors are clearly stated, and are definite in their suggestions. The objectives include things to do, to know, and to feel about healthful living. While the material presented is definite, it does not hamper the initiative of the teacher, since details are left to each teacher to work out as she sees fit. Activities are given a number so that reference to the work of the various grades may be made in a convenient fashion.

Certain organized health procedures are advocated in each grade. They are adapted to each age level and provide a new approach to the old material. These procedures are: (1) *morning inspection,* (2) *growth recording,* (3) *temperature recording,* (4) *accident reporting,* (5) *fire drills,* and (6) *May Day program.* These procedures are sound and worth repeating according to the age level of the group.

Mere repetition from one grade to another would be deadly. A plan that is truly spiral, approaches the problem from the level of the child's interest. The spiral plan is particularly valuable in health education since it requires many repetitions to secure good habit formation. The fact that the approach is spiral can be shown through an examination of "Safety Practices" as outlined in the first three grades.

The general objectives for safety education in the first grade are: to teach the pupil how to get to and from school safely; to reduce the number of traffic accidents between pedestrian and vehicle. Activities include sand table demonstration to show community, traffic, and safe routes to school; a directory and a game to help the child learn his name and address; traffic demonstration in the room and on a corner nearby; drills with flash cards using such words as "stop," "go," etc.

Objectives in the second grade are: to learn how to be a safe pedestrian; to learn to avoid falls; to learn to recognize fire hazards. Activities for this grade teach the meaning of traffic signals through the use of a poster, "Watch the Signals"; dramatization of traffic and pedestrians at an intersection drawn on the floor; fire dangers, student accident reporting as in grade one; a class accident chart; locating areas that may cause falls; a puppet safety play.

The third grade lists these objectives: to lead the pupil to begin to analyze situations which lead to greater safety in the school, home, and neighborhood; to learn simple first aid practices. These objectives are to be accomplished by: *accident reporting; safety patrol talk;* and *demonstration* to show activities of patrol and policeman on the corner; word study; *fire alarm practice game; what would you do?* (a discussion of an interesting situation in a game); *surveying the playground for accident hazards; study of a first aid chest.*

This curriculum will be of interest and value to folks in other states. One may not always agree that the suggested activities are the best possible ("A Safety Letter," A III-19, p. 194) or that certain activities are not better used on a school- (Jr. Safety Council, p. 330, A VI-6) or on a city- or county-wide basis (A Safety News Sheet, A-V-7, p. 284) and (A Safety Calendar, A-VI-12, p. 334) rather than in a project for one class; yet, everyone will find this course rich in suggestions, practical in nature, and based on a sound philosophy of health education.

MARY MAY WYMAN
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EXERCISE AND ITS PHYSIOLOGY. Adrian Gordon Gould, Ph.B., M.D. and Joseph A. Dye, A.B., Ph.D. (A. S. Barnes & Co., 1933) 434 pages. 61 illustrations. $3.00.

In presenting *Exercise and Its Physiology* the authors have attempted to include in a single volume the fundamental principles of physiology together with a discussion of the effects of exercise on the various physiological functions. This scheme necessitated the use of about one-half of the book for the discussion of fundamental physiological principles.

Exercise and Its Physiology can scarcely be recognized as an elementary treatise and will only fulfill the needs of physical education students who have a thorough grounding in physics and chemistry.

The approach to fundamental physiology is scientific, accurate, and up-to-date. The discussion of the physiological effects of exercise is based on a rather extensive review of the widely scattered literature on this subject.

The main contribution of the book is a clear presentation of the literature dealing with the effects of exercise on the various physiological functions. Special consideration is given to "second wind," training, and emotional stress. The benefits and dangers of physical exertion are briefly discussed. At the end of each chapter the authors have placed a list of timely questions as well as a rather extensive bibliography of source material.

The book is well done and serves as a valuable guide to advanced students in physical education and others who are interested in the effects of exercise on physiological functions.

W. W. TUTTLE
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FIRST AID TEXTBOOK. American Red Cross. (P. Blakiston's Son and Company, Inc., 1933) 237 pages, 110 illustrations. Paper 60 cents. Cloth $1.00. 25% discount in quantities for class use.

This valuable and very practical text has been revised in accord with the approved modern practices, checked by leading medical authorities. The current attention to safety and accident-prevention makes a course in first aid an appropriate part of education.

It is especially adapted to the needs of classes in the junior and senior high schools, where a first aid course is frequently and very suitably included in the required course in personal hygiene. It is also appropriate for special courses in the Camp Fire Girls, Boy Scouts, and similar organizations. The book is a valuable reference for the home or summer camp, especially in remote locations, where physicians' services may be delayed.

Paper, type, illustrations, and index are excellent. The arrangement in fourteen chapters is dominated by logical organization rather than in the form of teaching lessons. No questions or review methods are included. The method of treatment is direct and practical, with enough anatomy and physiology in an early chapter to furnish the knowledge required for the emergency measures throughout the book. The chapter on "Common Emergencies" is especially practical. Directions given throughout are careful, conservative, and safe. Emphasis is constantly placed upon obtaining the service of a physician when he is available.

Teachers find a natural interest in most boys and girls in this dramatic method of teaching the care of emergencies, and it furnishes a real application for much incidental physiology and anatomy, which would otherwise be uninteresting and meaningless. It should be taught with great emphasis upon pupil-activity and objective demonstration. Organization of first aid clubs and squad competitions are useful methods of teaching. School assembly demonstrations may also stimulate interest in giving publicity to the program. High school teachers of hygiene will probably find it desirable to select the needed material to fit the local syllabus of hygiene, or perhaps to rearrange the material. The total content of the book is probably too large for detailed study in the

usual hygiene course, since other topics of personal, community, and home hygiene must also have a place.

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HEALTH STUDIES. F. M. Gregg and Hugh Grant Rowell. PERSONAL HEALTH. 314 pages. 84 cents. HOME AND COMMUNITY. 256 pages. 76 cents. (World Book Co., 1932).

These two books are designed for use in the junior high school. *Home and Community Health* is designed for use in grades seven or eight, and *Personal Health*, for grades eight or nine. They are designed for use as basic texts, but they can be used as supplementary material. The authors undoubtedly had fairly well-equipped schools in mind, although much of the needed apparatus is simple and of the type that need not be expensive.

The plan of these books is to present exercises that enable the student to experiment to find out facts for himself. It has been of interest to the reviewer of these books to observe how much of the experiments in one of the authors' earlier works, *Hygiene as Nature Study*, has been incorporated in courses of study from many places. These books are built on much this same plan of regarding hygiene as nature study or learning about health by experiment. There is sufficient discussion to make the experiments intelligible.

Materials needed for the experiments are listed in convenient fashion and illustrations are used to aid in setting up the more difficult experiments. A summary in the form of an exercise is given for each study. Pronunciation of the more difficult words is given in parentheses in the text. This arrangement is a decided aid to the pupils.

The illustrations are many and varied in nature—photographs, line drawings, diagrams, graphs, etc. Those in *Home and Community* are particularly appealing to the child.

Since much of the material is in the form of questions and suggested experiments, there is a manual for each of these books. The reviewer did not have opportunity to examine these manuals, but it is hoped that the manuals contain definite information so that teachers who are not well trained will not make errors.

In general, this series is a distinct contribution to the field of junior high school health education. The books stimulate pupil activity, minimizing the need for teacher direction; they are positive in their viewpoint and encourage experimentation on the part of the students.

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GRADUATE DIVISION (Men—Women)

Requirements for Entrance

Christian character; Proven ability as a teacher for at least two years; Graduation from approved Bachelor's Degree course.

Students from regular Science courses ordinarily require two years.

Students from four-year professional courses may reduce the required years, depending upon the character of their work.

Requirements for Graduation

Completion of 31 semester hours of work on the graduate level in addition to fulfilment of undergraduate professional requirements. Courses offered include:

Physical Education Seminar: Covering advanced and original work.

Character Education: Discussions and examination of the literature on the subject.

Experimental Physiology: General Survey with selection of individual study by student.

Experimental Physics: Study particularly of Physics in relation to athletics, mechanics.

Thesis: An experimental study of some essential topic.

[illegible] Students in Graduate Division of Summer School for 1929.

20 Graduate Students during current year, 1929-1930.

[illegible]00 men in the undergraduate department during the current year.

J. H. McCURDY, A.M., M.D., M.P.E., *Director*
GEORGE B. AFFLECK, A.M., M.P.E., *Associate Director*
JOHN D. BROCK, M.Ed., *Secretary*

Write to the secretary for Printed Matter and Application Blank